

# *Assembleon*

LEADERS IN ELECTRONIC MANUFACTURING TECHNOLOGY

## **Twin Bulk Feeders**



I N F I N I T E   S O L U T I O N S   •   F O C U S E D   O N   R E S U L T S

MANUAL TITLE	MANUAL NUMBER	PA NUMBER
Twin Bulk Feeders	4022 591 91561 (formerly part of 5322 871 61604)	PA 2648/xx

HISTORY					
ISSUE	DATE	ORDER NUMBER	REVISION CODE	STATUS	RELEASE DOCUMENT
First Issue	November 2004	4022 591 91561	04.01	Current	DI-FDR-012

Assembléon Customer Services maintains a customer site on the internet. This site provides the latest information such as bulletins, surveys about spare parts, manuals and software updates. The status of this document can also be checked.

Subscribe first to access this information. So complete the Support Request Form on the Assembléon website in its entirety.  
The Assembléon website:

*[www.assembleon.com](http://www.assembleon.com)*


We have endeavoured to ensure that the information in this document was correct when published. If, when using this document, errors, omissions or anomalies are discovered, please inform us using the reply-form attached. We thank you for this service, in advance, as it will help us to ensure that you, the customer, receive the highest possible quality of information and service.

Manual Title: **Twin Bulk Feeders**

Manual Number: **4022 591 91561**

PA Number: **PA 2648/xx**

Please, don't forget to fill-in this!

Update Code Manual: ○○.○○○ 

---

**FROM:**

Name .....

Company .....

Address .....

Date .....

---

**DOCUMENT IRREGULARITIES:**

Page/Paragraph Number .....

Erroneous Entry .....

.....

.....

.....

Consequence .....

.....

.....

.....

Suggestion .....

.....

.....

.....

---

**TO:****Assembléon**

Supply Centre Customer Support

P.O. Box 80067

Building HVS

5600 KA Eindhoven

The Netherlands

Fax: +31 40 27 246 10

Document irregularities can also be reported via the Assembléon website:

*[www.assembleon.com](http://www.assembleon.com)*

Subscribed persons only.



---

# PA2648/xx: FCM-II Twin Bulk Feeders

---

## Table of Contents

<b>CHAPTER 1</b>	<b>Introduction.....</b>	<b>1-1</b>
1.1	System .....	1-1
1.2	General Introduction.....	1-1
1.3	Identification.....	1-2
1.4	Electrical and Pneumactical Requirements .....	1-3
1.5	Software Requirements .....	1-3
<b>CHAPTER 2</b>	<b>Handling.....</b>	<b>2-1</b>
2.1	Preparation .....	2-1
2.2	Dedicating Bulk Cassettes.....	2-1
2.3	Handling: Loading .....	2-1
2.3.1	Step 1: Correct Twin Bulk Feeder Type .....	2-1
2.3.2	Step 2: Adding the bulk case .....	2-2
2.3.3	Step 3: Opening the bulk cases(s) .....	2-3
2.3.4	Step 4: Placing the feeder onto the feeder trolley.....	2-4
2.3.5	Step 5: Check if feeder is ON.....	2-6
2.3.6	Step 6: Fill front of feeder with components.....	2-6
2.4	Bulk Feeder Handling: Operation.....	2-7
2.4.1	Empty bulk case detection.....	2-7
2.4.2	Pick Errors .....	2-9

---

## Table of Contents

---

2.4.3	Batch Change.....	2-10
2.4.3.1	Batch change: Using the same package type and value.....	2-10
2.4.3.2	Batch change: Using the same package type of different value.....	2-10
2.4.3.3	Batch change: Using a different package type.....	2-16
2.4.4	Off-Line Handling.....	2-16
2.4.4.1	Removing the feeder from the feeder trolley.....	2-16
2.4.4.2	Storing the twin bulk feeder .....	2-18
<b>CHAPTER 3</b>	<b>Functional Description .....</b>	<b>3-1</b>
3.1	Short functional description.....	3-1
3.2	Human Interface.....	3-2
3.3	Twin Bulk Feeder Modules .....	3-3
3.3.1	Twin Bulk Feeder Modules 1-19 .....	3-4
3.3.2	Module 7: Upper Feeder Assembly .....	3-6
3.3.2.1	Module 7-22: Top Cover Assembly .....	3-8
3.3.3	Module 8: Bulk Cassette Assembly.....	3-10
3.3.4	Module 14: Base Block Assembly.....	3-12
3.3.5	Bulk Case.....	3-16
<b>CHAPTER 4</b>	<b>Preventive Maintenance.....</b>	<b>4-1</b>
4.1	Preventive Maintenance Schedule.....	4-1
4.2	Corrective Maintenance Schedule.....	4-2
4.3	Maintenance .....	4-2
4.3.1	Maintenance: Pick Station and Transport Area.....	4-2
4.3.1.1	Upper Feeder .....	4-2
4.3.1.2	Lower Feeder.....	4-4
4.3.2	Maintenance: Sensors .....	4-5
4.3.3	Maintenance: Bulk Cassettes.....	4-7

---

## Table of Contents

---

<b>CHAPTER 5</b>	<b>Trouble Shooting.....</b>	<b>5-1</b>
5.1	Introduction .....	5-1
5.1.1	General Check Point .....	5-1
5.1.2	Automatic and Manual Refire Level too high.....	5-2
5.1.2.1	Lifetime causes .....	5-2
5.1.2.2	Logical causes .....	5-2
5.1.2.3	Complex causes.....	5-3
5.2	Errors when running production.....	5-5
5.2.1	Possible problem area's.....	5-5
5.2.1.1	Pick Position: Recoverable obstructions.....	5-7
5.2.1.2	Obstruction: From Bulk Case to Bulk Cassette .....	5-9
5.2.1.3	Obstruction: At moveable gate.....	5-10
5.2.1.4	Obstruction: At moveable block.....	5-14
5.2.1.5	Pick Position / Transport Area: Unrecoverable obstructions. ....	5-15
5.3	Using the best bulk feeder component. ....	5-19
5.3.1	Component dimensions and tolerances .....	5-20
5.3.2	Component shape recommendations.....	5-21
<b>CHAPTER 6</b>	<b>Replacement Instructions.....</b>	<b>6-1</b>
6.1	List of Tools .....	6-1
6.2	Modules 2 to 19 .....	6-3
6.2.1	O-Ring.....	6-4
6.2.2	Slider, Lower Feeder .....	6-4
6.2.3	Upper Feeder Assembly.....	6-5
6.2.4	Bulk Cassette Assembly.....	6-5
6.2.5	Hose Pillar Restriction + O-Ring, Upper Bulk Cassette.....	6-5
6.2.6	Base Block Assembly .....	6-6
6.2.7	Side Plate .....	6-6
6.2.8	Fork, lower feeder .....	6-7

---

## Table of Contents

---

6.3	Module 7: Upper Feeder assembly.....	6-8
6.3.1	Upper Feeder assembly.....	6-9
6.3.2	Upper Feeder sensors .....	6-10
6.3.3	Bulk Cassette clamping mechanism .....	6-11
6.3.4	O-ring, Nipple .....	6-12
6.3.5	Restriction + O-Ring.....	6-12
6.3.6	Top Cover .....	6-13
6.3.7	Fork, Upper Feeder .....	6-14
6.3.8	Slider, Upper Feeder.....	6-14
6.3.9	Cylinder, Pusher .....	6-15
6.4	Module 7-21: Top Cover Assembly .....	6-16
6.4.1	All Items.....	6-16
6.5	Module 8: Bulk Cassette.....	6-17
6.5.1	Cover .....	6-18
6.5.2	Bulk Cassette parts .....	6-21
6.6	Module 14: Base Block Assembly .....	6-24
6.6.1	Positioning Pins .....	6-25
6.6.2	Sensor Print .....	6-26
6.6.3	Air Nipple.....	6-27
6.6.4	Sensor .....	6-28
6.6.5	Component Stopper pin .....	6-29
6.6.6	Upper Feeder locking mechanism.....	6-29
6.6.7	Bulk Cassette clamping mechanism .....	6-30
6.6.8	Human interface .....	6-31
6.6.9	Interface Set.....	6-32
6.6.9.1	Handle + Cable.....	6-32
6.6.9.2	Clamp Unit.....	6-35
6.6.9.3	Electrical Interface.....	6-36
6.6.10	Control Unit.....	6-37
6.6.11	Valve Assemblies.....	6-38
6.6.12	Guide Block .....	6-39
6.6.13	Pneumatic Pen .....	6-40
6.6.14	Feeder Guide Pen + Electrical Interface.....	6-41
6.6.15	Cylinder .....	6-42
6.6.16	Hose Length.....	6-43



---

## Table of Contents

---

<b>CHAPTER 7</b>	<b>Measuring and Adjusting Data .....</b>	<b>7-1</b>
7.1	Spare Parts.....	7-1
7.2	Adjustments .....	7-1
7.2.1	Adjustments.....	7-1
7.2.1.1	PA2648/35: C0805T1.25 PCB Settings .....	7-2
7.2.1.2	PA2648/45: Melf 0805 PCB Settings.....	7-2
7.2.1.3	PA2648/50: C0402 PCB Settings .....	7-3
7.2.1.4	PA2648/60: R0402 PCB Settings.....	7-3
7.2.1.5	PA2648/70: C0603 PCB Settings .....	7-4
7.2.1.6	PA2648/80: R0603 PCB Settings.....	7-4
7.2.1.7	PA2648/85: Melf 0604 PCB Settings.....	7-5
7.2.1.8	PA2648/90: C0805T0.6 PCB Settings .....	7-5
<b>CHAPTER 8</b>	<b>Spare Parts Lists .....</b>	<b>8-1</b>
8.1	Module Overview .....	8-1
8.2	Repair.....	8-1
8.3	Spare Parts Lists .....	8-2
	Commercial Numbers.....	8-4
	Modules 2- 19: Main Modules.....	8-6
	Module 7: Upper Feeder Assembly .....	8-8
	Module 7-22: Top Cover Assembly.....	8-10
	Module 8: Bulk Cassette Assembly.....	8-12
	Module 14: Base Block Assembly.....	8-14
	Module 14: Base Block Assembly (Pneumatic parts) .....	8-18
<b>CHAPTER 9</b>	<b>Drawings and Diagrams .....</b>	<b>9-1</b>
9.1	Diagrams .....	9-1
9.1.1	Electrical Block Diagram .....	9-1
9.1.2	Pneumatic Block Diagram.....	9-2

---

## Table of Contents

---

**Intentionally left blank**

---

---

**CHAPTER I Introduction**

---

**I.1 System**

The Twin and Single Lane Bulk Feeder can only be used on a FCM - II (FC5.0 or higher) system. This system uses the PA2631/00 feeder trolley, equipped with the feeder interface, suitable for these Bulk Feeders.

**I.2 General Introduction**

This manual is intended to be a guideline for:

- Identifying, operating and handling of the bulk feeders: Chapters 1 & 2.
- Maintenance, Repair and Adjustments: All other chapters.

The manual is applicable to the feeder range mentioned in table 1.2. This table also specifies the bulk cassette and component type per twin bulk feeder.

Type Number	Bulk Cassette	Component			
		Component Type	Length (mm)	Width (mm)	Thickness (mm)
PA2648/00	0603C	C0201 (0603C)	0.57 - 0.63	0.27 - 0.33	0.27 - 0.33
PA2648/35	2012-125	C0805 (2012C) T=1.25	1.90 - 2.10	1.15 - 1.35	1.15 - 1.35
PA2648/45	20M	MELF 0805	1.90 - 2.10	Ø 1.15 - 1.35	
PA2648/50	1005C	C0402 (1005C)	0.95 - 1.05	0.45 - 0.55	0.45 - 0.55
PA2648/60	1005R	R0402 (1005R)	0.95 - 1.05	0.45 - 0.55	0.30 - 0.40
PA2648/70	1608C	C0603 (1608C)	1.53 - 1.67	0.73 - 0.87	0.73 - 0.87
PA2648/80	1608R	R0603 (1608R)	1.50 - 1.70	0.70 - 0.90	0.35 - 0.55
PA2648/85	16M	MELF 0604	1.50 - 1.70	Ø 0.90 - 1.10	
PA2648/90	2012-06	C0805 (2012C) T=0.6	1.90 - 2.10	1.15 - 1.35	0.50 - 0.70
PA2648/95	2012-06	R0805	1.90 - 2.10	1.15 - 1.35	0.50 - 0.70

TABLE 1.2. Single/Twin Bulk Feeder, Bulk Cassette and component combinations



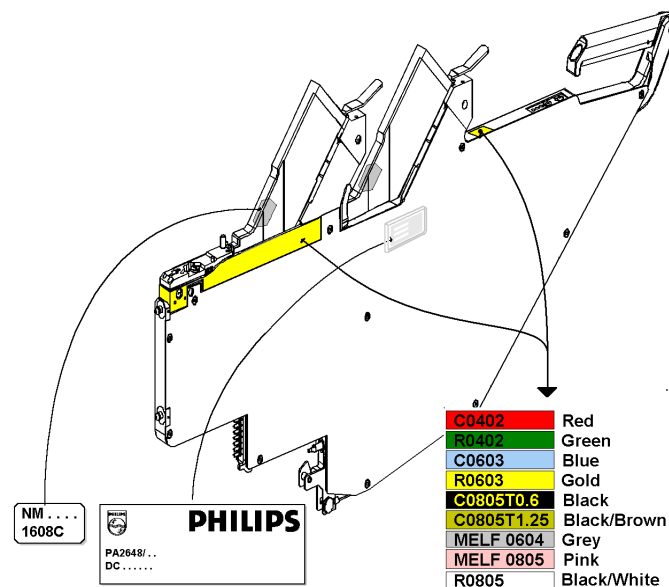
**NOTE:** The dimensions of the component are of extreme importance for the correct functioning of the bulk feeder. If components are used with dimensions outside the above limits, no guarantee on the specifications with respect to refires can be guaranteed. In short, it means that: The components **must** match the dimensions, **must** match the bulk cassette, **must** match the bulk feeder. Refer also to section 1.3.



Dimensions of bulkfeeder components are not specified yet. They differ from the IEC specifications CECC 32101-801 which only specifies tape component dimensions. Make sure components are delivered within the dimensions specified in table I.2. It is recommended to request for a component dimension verification sheet from your component supplier. Check also chapter 5 for the best type of bulk component.

### I.3 Identification

The following identifications apply to the Twin Bulk Feeder



PA Nr	Color coding	Lane sticker	Component Type (inch)	Bulk Cassette (metric)
/00	aluminium	grey	C0201	0603C
/35*	black	brown (also on lane)	C0805 T = 1.25	2012-125
/45*	black	pink (also on lane)	MELF 0805	20 M
/50	red	red	C0402	1005 C
/60	green	green	R 0402	1005 R
/70	blue	blue	C 0603	1608 C
/80	gold	gold	R 0603	1608 R
/85	grey	grey	MELF 0604	16 M
/90	black	black	C0805 T = 0.6	2012-06
/95	black	white	R0805	2012-06

Serial Number →

Serial Number Identification			
DC	Y	WW	NNN
Eindhoven	Year	Week	Rotation Nr.

FIGURE I.3

Identifications

## **I.4 Electrical and Pneumatical Requirements**

Twin Bulk Feeder power requirements	
Active power consumption	Max 10.6 Watt at range 11.6 VDC – 13 VDC
Stand-by power consumption	Less than 0.6 Watt at range 11.6 VDC – 13 VDC

TABLE I.4a

Electrical Requirements

---

Twin Bulk Feeder Pneumatical requirements	
Air Pressure	5.5 ± 0.4 Bar
Air Flow	30 NI/min during Bulk Cassette pulse and 30 NI/min during the Transport pulse, during a minimum tact time of 550 msec.
Air Conditions:	
■ Moisture	■ Dewpoint less than -17°
■ Solid Body:	■ Less than 0.4 µm
■ Oil	■ Less than 0.01 mg/Nm <sup>3</sup>

TABLE I.4b

Pneumatical Requirements

---

## **I.5 Software Requirements**

The Twin Bulk Feeders are supported from CimBridge version 1.06 and onwards. Upgrade packages for older versions of CimBridge are available at the supplier. Information on CimBridge upgrades is included with the CimBridge product.

**Intentionally left blank**

---

---

## CHAPTER 2 Handling

---

### 2.1 Preparation

Before placing a Twin Bulk Feeder into the trolley, make sure that the interface in the trolley is free of components and debris.

### 2.2 Dedicating Bulk Cassettes

During batch changes it is not recommended to leave a bulk cassette on a bulk feeder assuming that it is empty. Mixing different values of components (example: 70pF capacitors of batch 1 mixed with 150pF capacitors of batch 2 and both components are C0402) is inevitable.

To avoid this situation it is recommended by Philips to dedicate bulk cassettes and bulk cases to **one value** of component. For this reason, bulk cassettes are separately available:

Available Bulk Cassettes				
Bulk Cassette Commercial Number	Bulk Cassette Service Order Number	Belongs to Bulkfeeder	Component	
			Inch	Metric
PA2637/00	5322 693 11306	PA2648/50	C0402	1005C
PA2637/06	5322 693 11307	PA2648/60	R0402	1005R
PA2637/10	5322 693 11308	PA2648/70	C0603	1608C
PA2637/16	5322 693 11309	PA2648/80	R0603	1608R
PA2637/20	5322 693 11311	PA2648/90 PA2648/95	C0805 T=0.6 R0805	2012C T=0.6 2012R
PA2637/30	5322 693 11312	PA2648/35	C0805 T=1.25	2012C T=1.25
PA2637/35	4022 591 17980	PA2648/45	MELF 0805	20M
PA2637/40	4022 591 17990	PA2648/85	MELF 0604	16M
PA2637/50	4022 591 06451	PA2648/00	C0201	0603C

TABLE 2.2

Dedicating Bulk Cassettes

### 2.3 Handling: Loading

The principle of loading is explained on the Quick Reference Card. This card is explained next:

## 2.3.1 Step 1: Correct Twin Bulk Feeder Type

For easy recognition, the upper feeder part of the twin bulk feeder is colored. The feeder must be installed with the correct bulk case (components) and bulk cassette. Refer also to chapter 1.3.

PA Nr	Color coding	Lane sticker	Component Type (inch)	Bulk Cassette (metric)
/00	aluminium	grey	C0201	0603C
/35*	black	brown (also on lane)	C0805 T = 1.25	2012-125
/45*	black	pink (also on lane)	MELF 0805	20 M
/50	red	red	C0402	1005 C
/60	green	green	R 0402	1005 R
/70	blue	blue	C 0603	1608 C
/80	gold	gold	R 0603	1608 R
/85	grey	grey	MELF 0604	16 M
/90	black	black	C0805 T = 0.6	2012-06
/95	black	white	R0805	2012-06

\* Note: The C0805T1.25 Single Lane Bulk Feeder is not equipped with an Upper Feeder

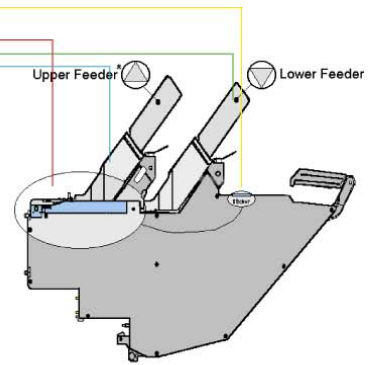


FIGURE 2.3.1

Using the correct twin bulk feeder



**UPPER FEEDER:** The component path is fed by the front bulk case. The path itself is located on top of the component path that is fed by the rear bulk case. Since the paths are located on top of each other, this is called the 'upper feeder', always marked and referred to by the symbol as shown before this text.



! When using a single lane bulk feeder, all references to the



**LOWER FEEDER:** The same story is valid as with the 'upper feeder', but since this feeder is located underneath this 'upper feeder', it is referred to as the 'lower feeder'. This 'lower feeder' is always marked and referred to by the symbol as shown before this text.

## 2.3.2 Step 2: Adding the bulk case

- Check first with the FCM Action Spec if the bulk case with components should be placed on the upper or lower feeder. The FCM Action Spec identifies the pick position of this feeder. The relation between the pick positions and the feeder positions are:

- Pick 1:  Upper Feeder. The pick position at the front of the feeder
- Pick 2:  Lower Feeder. The other pick position. See also figure 2.3.2a.



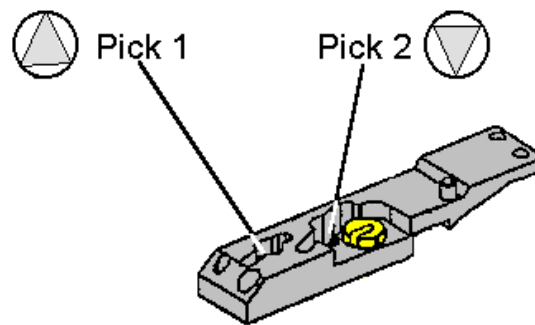


FIGURE 2.3.2a

Pick positions in relation to *upper* and *lower* feeder.

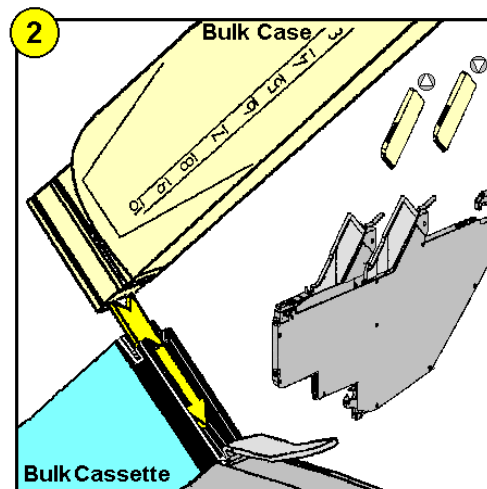


FIGURE 2.3.2b

Adding the bulk cases.



**NOTE:** Make sure the components are placed onto the bulk cassette that corresponds to the correct pick position of the feeder.

### 2.3.3 Step 3: Opening the bulk case(s)

- Open the case(s) in the direction as shown in figure 2.3.3. The components will fall out of the case into the bulk cassette.

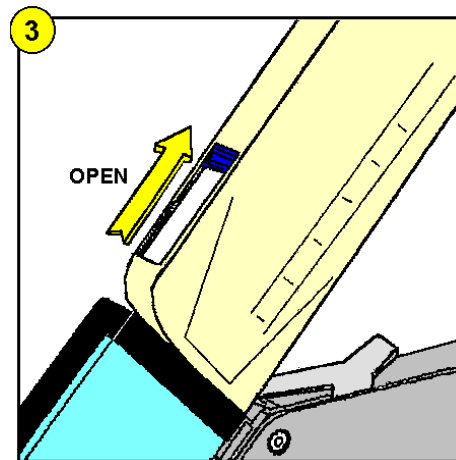


FIGURE 2.3.3

Opening the bulk case

#### **2.3.4 Step 4: Placing the feeder onto the feeder trolley**

- Move the handle to its most upward position. The clamp lever of the feeder will open. See figure 2.3.4a

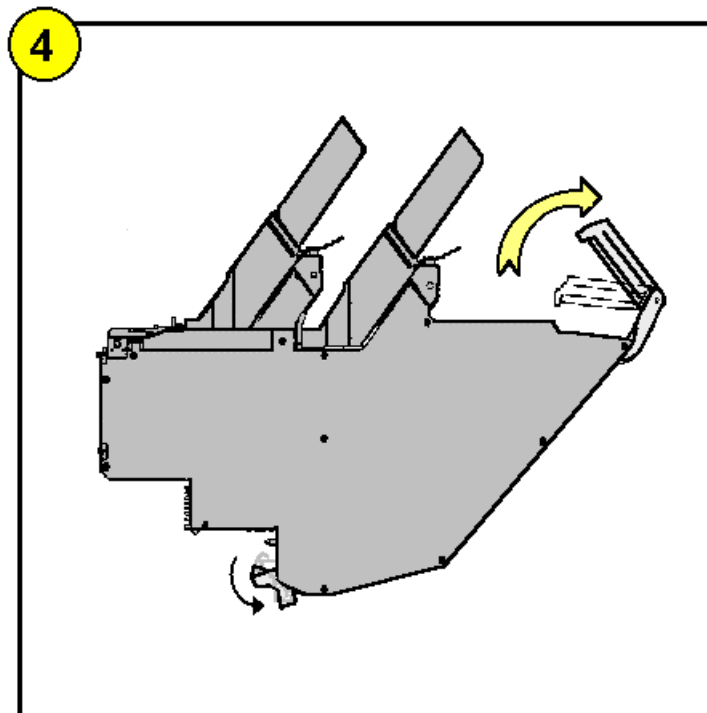


FIGURE 2.3.4a

Opening the clamp lever.

- Slide the feeder in its '*open*' position onto the feeder trolley. The feeder will fit on *odd* positions only.

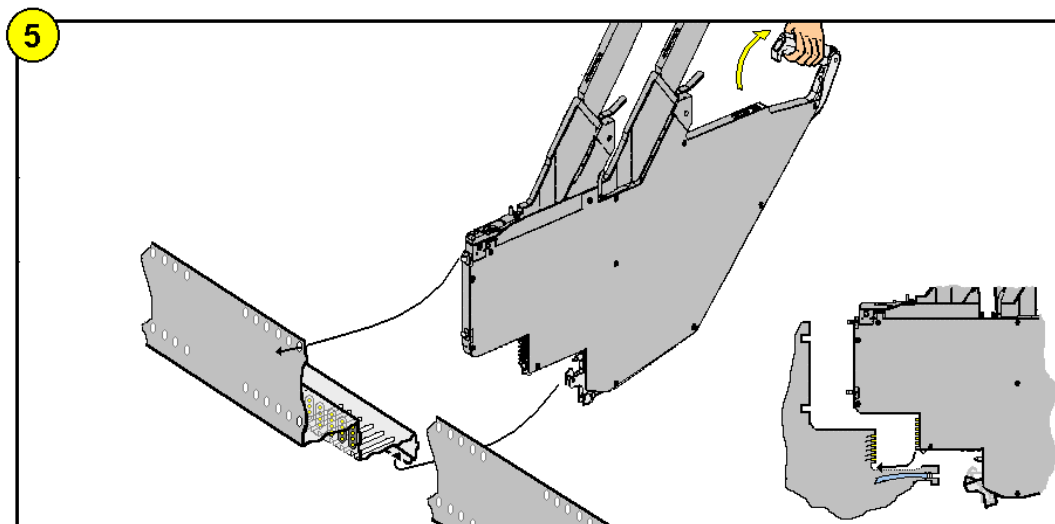


FIGURE 2.3.4b

Slide feeder onto feeder trolley

- Push the feeder as far as possible to the front of the interface and lock the feeder onto the feeder trolley by moving the handle back downwards (default position).
- Repeat previous steps for other feeders.

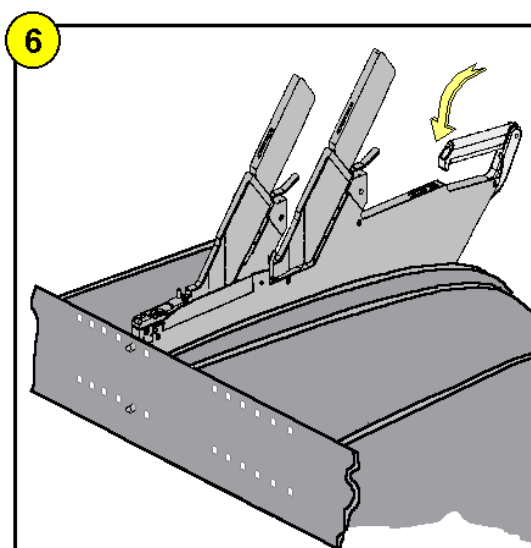


FIGURE 2.3.4c

Lock feeder onto feeder trolley.

### 2.3.5 Step 5: Check if feeder is ON.

After the feeder is inserted onto the feeder trolley, the correct voltage is supplied by the interface.

1. During the first half-a-second, the program in the feeder will initialize itself. During this time, the LED is OFF. After approximately half a second, the LED will light up.
2. The Green LED of the feeder must go ON to indicate that the feeder has connected to the power interface and is ready (*Only* when the trolley is connected to a power source).

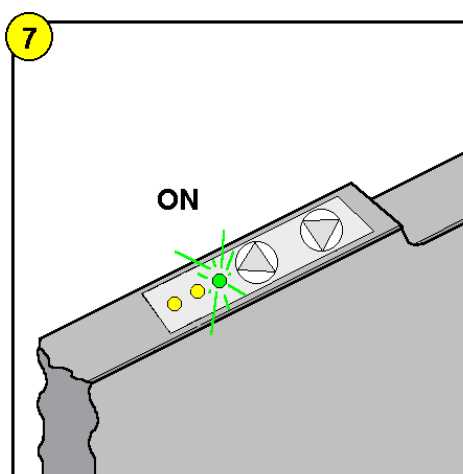


FIGURE 2.3.5

Feeder ON

### 2.3.6 Step 6: Fill front of feeder with components, bring component to pick position.

To start the pick process without any failures (missing components), some components have to be transported to the front of the feeder. A few components is already sufficient to start the pick process successfully.

The filling sequence is automatically performed after a single press on the *upper*- or *lower feeder* button:

- If components are stored in the *upper* feeder; Press the *upper feeder* button once. The feeder will start the automatic filling procedure. This procedure is a number of pulses for the bulk cassette (differs per component type) and one pulse for the transport lane + pick position.
- If components are stored in the *lower* feeder; Press the *lower feeder* button once. The feeder will start the automatic filling procedure. This procedure is a number of pulses for the bulk cassette (differs per component type) and one pulse for the transport lane + pick position.

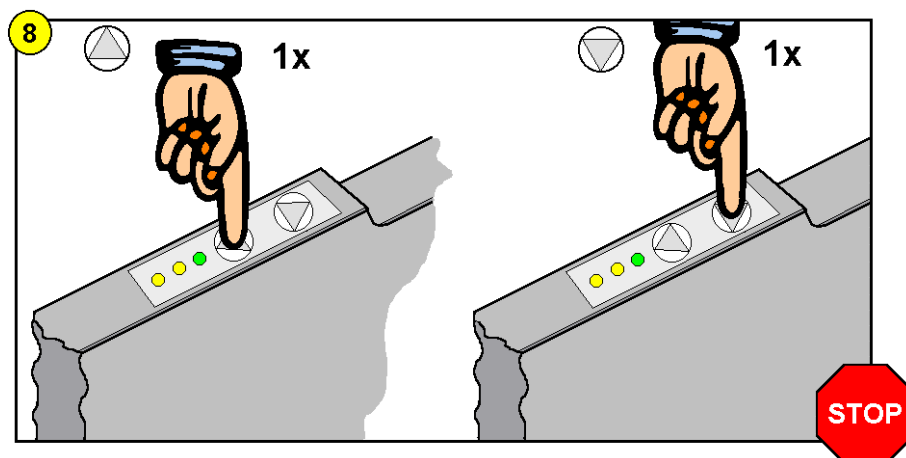


FIGURE 2.3.6

Transporting components to the front of the feeder and pick positions.

## 2.4 Bulk Feeder Handling: Operating

### 2.4.1 Empty bulk case detection

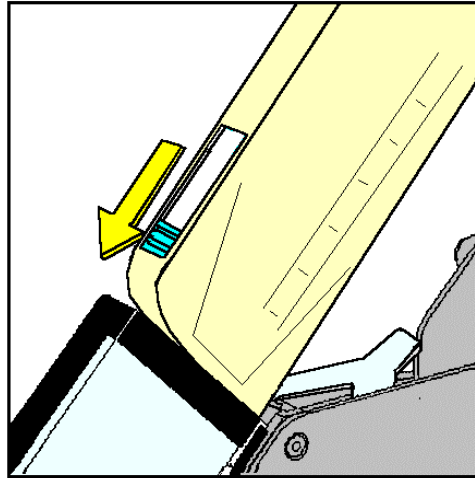
It is difficult to detect whether the bulk case is empty, especially if more than one twin bulk feeders are located beside each other.

If it is not possible to see if a bulk case has run empty, the following method can be used to find this out:

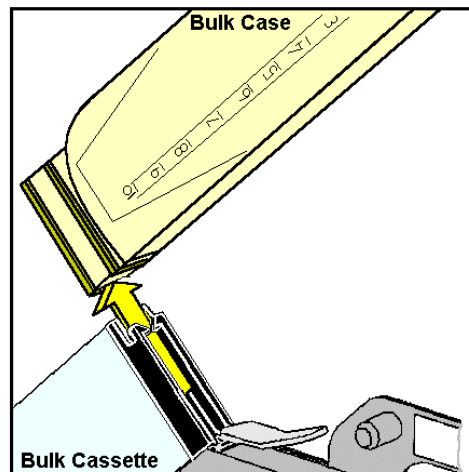
- Gently close the knob of the bulk case.
  - If it closes easily, the case is empty
  - If any friction at any point occurs, there are still components in the transition area from the bulk case to the bulk cassette. In this case it is not empty yet.

If the bulk case has to be exchanged, follow the following steps:

- Close the bulk case(s)

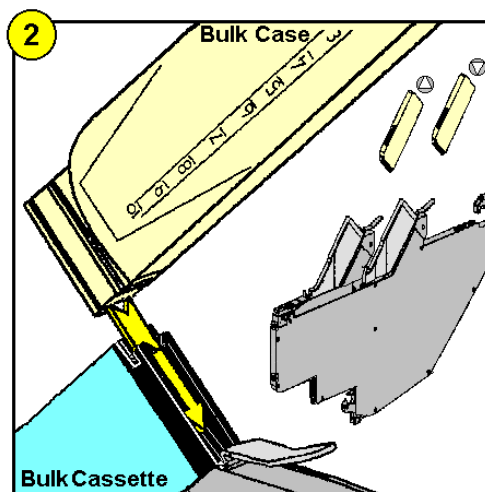


- Remove the bulk case(s)

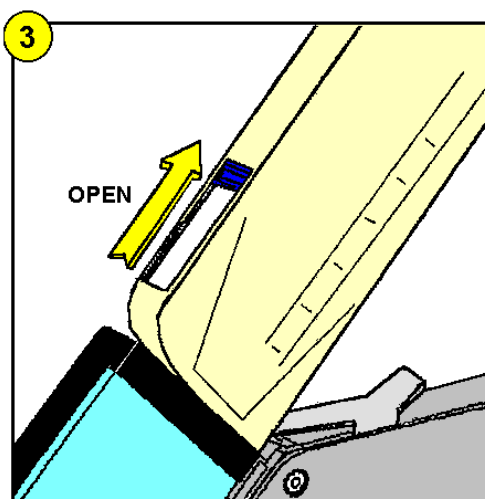


**NOTE:** When the bulk feeder is powered, some components can be blown out of the bulk cassette during running production. Especially when a few components are left in the bulk cassette.

- Insert new - full - bulk case(s).



- Open the knob(s)



- If necessary, repeat the fill procedure of section 2.3.6. This is done if the feeder ran empty or if there are not enough components left in the feeder.

### 2.4.2 Pick Errors

Pick Errors may have two – *most likely* - probable causes:

1. The bulk cassette has run empty. In this case, follow the instructions starting at section 2.4.1.
2. An error has occurred that requires manual intervention. In this case, refer to the trouble shooting list and error solving instructions as described in chapter 5.

### 2.4.3 Batch Change

#### 2.4.3.1 Batch Change: Using the same package type and value

If, during a batch change, the package type and the component value do not change, then the bulk feeder can remain on the system.

#### 2.4.3.2 Batch Change: Using the same package type of different value



#### **CAUTION**

**When the bulk cassette and feeder is not completely empty with previous componets, a mixture of component values will occur. This leads to unnecessary product quality errors.**

When using the same bulk cassette, make always sure that the whole component area (from the cassette, all the way up to the pick point) is empty. It can be a serious process (read: product) quality problem if a different value of component is mounted on a printed circuit.

#### **Situation 1:**

Especially small component types like 0402 and 0603 components can remain - unnoticed - behind in the transition area from the bulk case to the bulk cassette. See figure 2.4.3.2a.

#### **Situation 2:**

Components may also be hidden behind the 'metal parts' in the bulk cassette. The eye cannot easily see these hidden components.



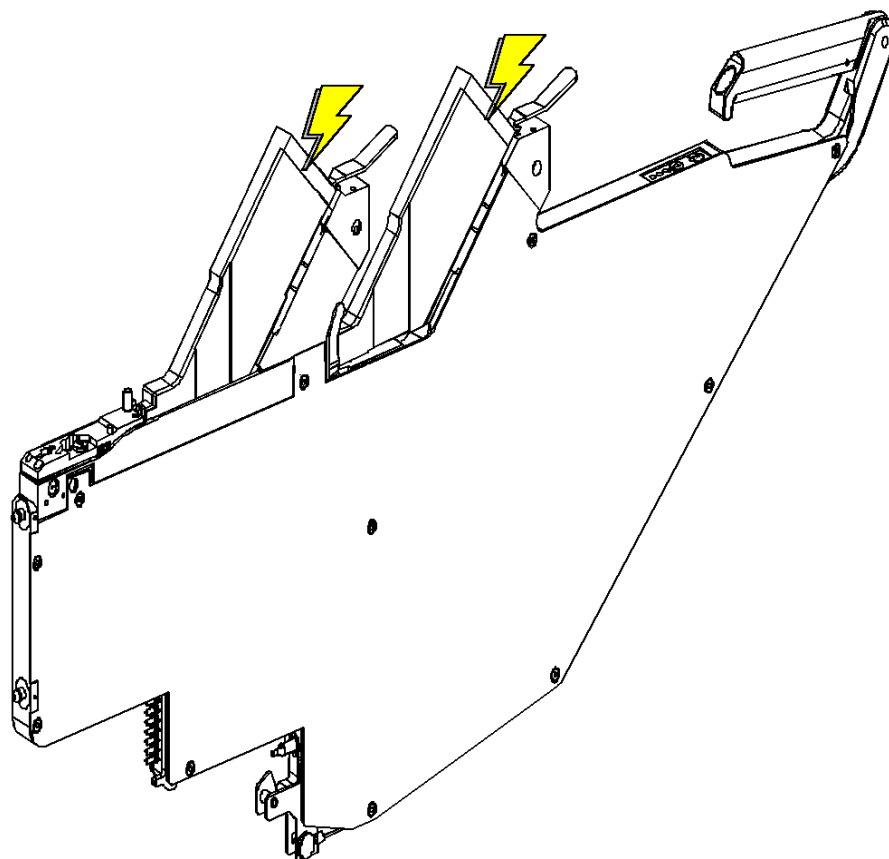
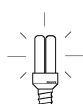


FIGURE 2.4.3.2a

Area where components are likely to remain behind unnoticed.



**TIP:** Philips recommends dedicating a bulk cassette **and** bulk case combination to one particular component package and type. When not in use, store the combination of bulk case and cassette, in a conditioned environment, off-line (refer to the end of chapter 5 for environmental conditions which are also valid for storing components).

Changing to a new component value is done as follows:

- Remove the bulk cassette from the bulk feeder:

Upper Feeder:

- ① Press the bulk cassette clamp to unlock the cassette
- ② Slide the bulk cassette alongside the feeder body until it is free from the holding slides. The cassette is now free and can be removed.

Lower Feeder:

- ③ Press the bulk cassette clamp to unlock the cassette
- ④ Slide the bulk cassette alongside the feeder body until it is free from the holding slides.
- ⑤ The bulk cassette cannot be removed straight upward. Tilt the cassette a little and then remove the cassette from between the upper feeder holder and the feeder body.

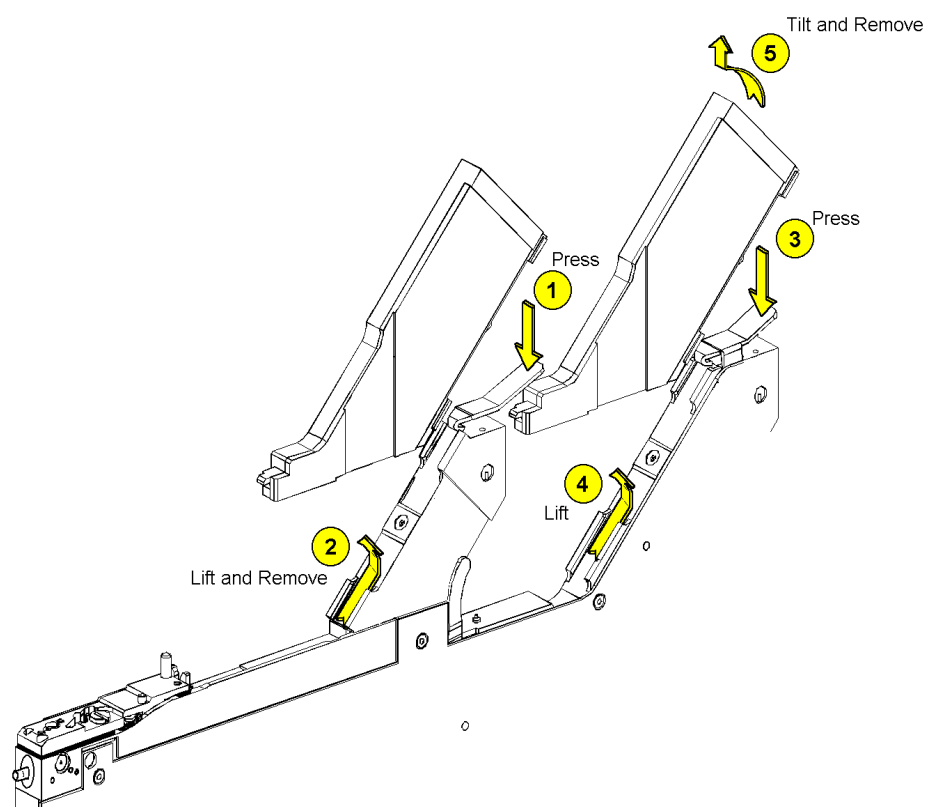
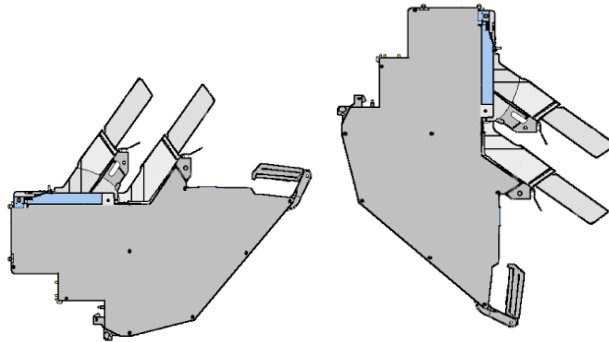


FIGURE 2.4.3.2b

Bulk Cassette Removal (bulk case not shown)



**NOTE:** Bulk cassettes for C0201 components don't have a component stopper. When removing the cassette, the complete feeder must be turned 90° to reduce the lost of components.



- Turn the bulk cassette upside-down and let the components flow into the bulk case.
- Tap the bulk cassette gently.

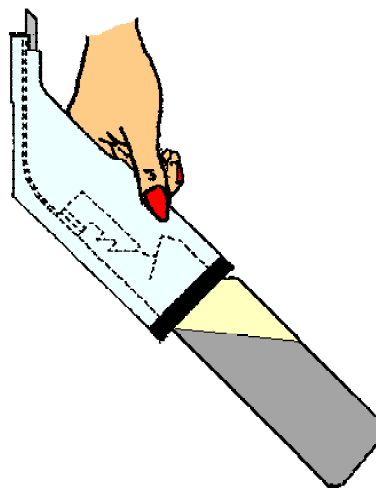


FIGURE 2.4.3.2c

Emptying the bulk cassette

- Close the bulk case
- Store the bulk cassette with the case in a conditioned environment (see also remarks at the end of chapter 5).
- or*
- Make really sure that the bulk cassette is empty in all spots if it will be re-used for the new component type value (**not recommended**).
- Before inserting the new (or empty) bulk cassette with case onto the twin bulk feeder, make sure that all components are removed from the component transport area and pick positions.

### *Upper Feeder (reference = figure 2.4.3.2d):*

1. Remove the knob first (Unlock direction shown in figure, see ①).

*Be careful not to loose the knob.*

2. Press the flat screw slightly downward and rotate clockwise 90°.
3. The top cover can now be removed.
4. **Remove all remaining components in the path and in the pick position by flipping the feeder upside down.**

It might be, due to cold stick or static, that components are stuck to the ceiling (= bottom side of cover *or* bottom side of the upper feeder). Please check and, if necessary, clean.

5. Placing the upper feeder top cover back is done in reverse order. To close the screw, press it inward and rotate it anti-clockwise over 90°.

### *Lower Feeder (reference = figure 2.4.3.2d):*

1. Set the handle of the lower feeder in the *unlock* position (backward).
2. Gently lift the whole upper feeder assembly from the feeder. Use two hands if possible (the lower feeder is now exposed).
3. **Remove all remaining components in the path and in the pick position by flipping the feeder upside down.**

It might be, due to cold stick or static, that components are stuck to the ceiling (= bottom side of cover *or* bottom side of the upper feeder). Please check and, if necessary, clean.

4. Place the upper feeder back into position and lock this part of the feeder by pressing the locking handle to the front position.



**NOTE:** If the locking handle does not close easily, there is a great chance that components are stuck between the component path and the upper feeder. Please check this first. **Do not force the upper feeder into position.**

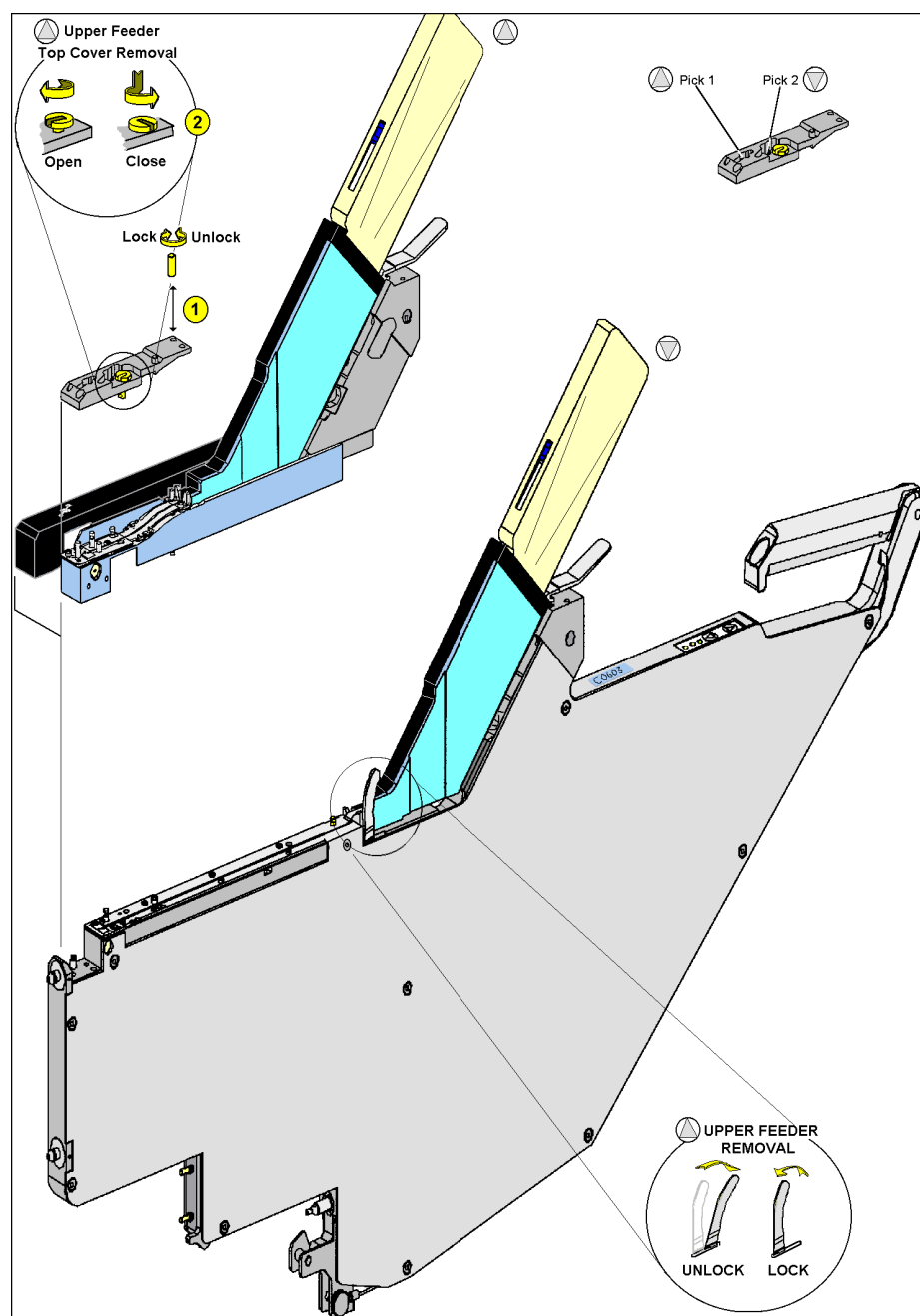


FIGURE 2.4.3.2d.

Upper feeder removal (for lower feeder) and upper feeder topcover removal.

- Insert the new bulk cassettes with the new component values onto the twin bulk feeder. There must be a good connection between the bulk cassettes and the component paths. Press gently, by moving the cassette clamp down, the cassette into position. The tip of the cassette must be connected well to the beginning of the transport area. *Do not force into position.*



### CAUTION

Never force the tip of the cassette into position. Damage or burrs provide obstructions in the component path. Smooth movement of components will be disturbed leading to high refire levels.

- Place the twin bulk feeder back onto the feeder trolley. Load the component path with components as described in section 2.3.

#### 2.4.3.3. Batch Change: Using a different package type.

Twin bulk feeders are dedicated to a particular package type. Select a bulk feeder that is meant for the package type that will be used. The package type-, twin bulk feeder combinations are identified in Chapter 1.

### 2.4.4 Off-Line Handling

#### 2.4.4.1 Removing the feeder from the feeder trolley

- Lift the handle upward to unlock the feeder from the feeder trolley. See figure 2.4.4.1a

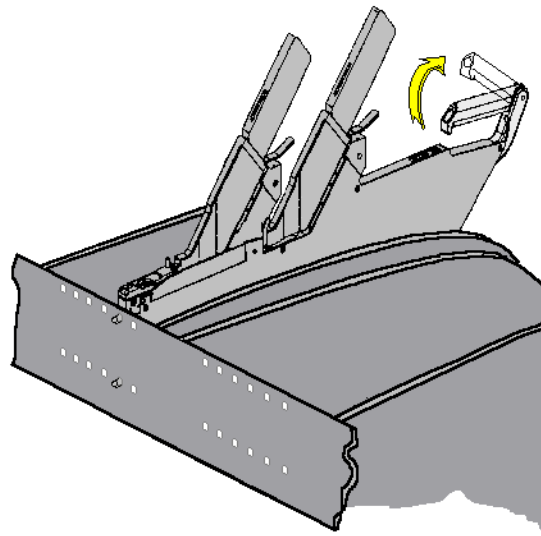


FIGURE 2.4.4.1a      Unlock the feeder from the feeder trolley

- Slide the feeder out of the feeder trolley as shown in figure 2.4.4.1b

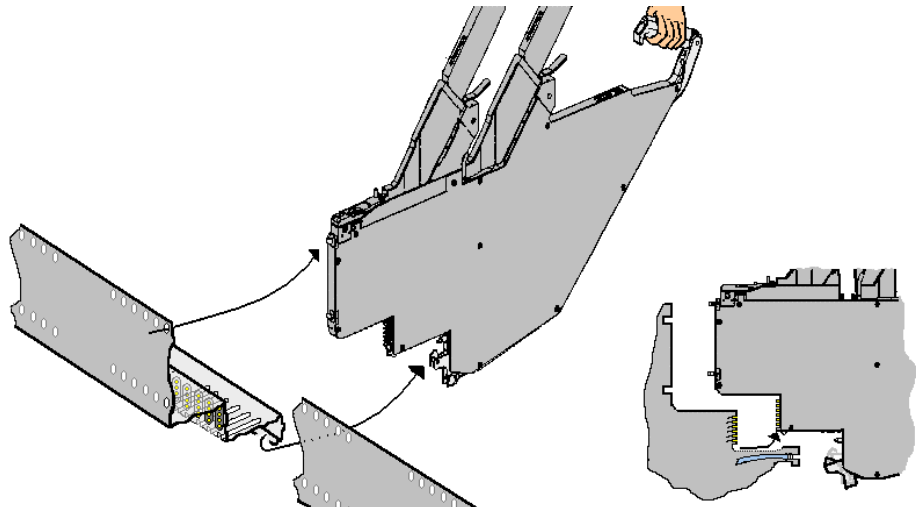


FIGURE 2.4.4.1b.      Removing the feeder from the feeder trolley

### 2.4.4.2 Storing the twin bulk feeder

It is very important to store feeders correctly. Philips offers a feeder storage cart with is available under commercial order number **PA2602/00**. This article is shown in figure 2.4.4.2 and can hold a *maximum* of:

- 50 feeders
- 108 reels (for tape feeders only)



FIGURE 2.4.4.2.

Feeder storage cart PA2602/00



---

**CHAPTER 3 Functional Description**

---

**3.1 Short Functional Description**

The description is valid for either pick position (or one, in case of a single lane bulk feeder).

1. At the pick position, there is a light beam.
2. When the nozzle picks a component, the light beam is interrupted. The control unit in the twin bulk feeder detects this.
3. The nozzle (+ component) will leave the pick position, reconnecting the light beam. This is the moment that the control unit knows there is no more component at the pick position and that a new component should be prepared (for the next pick):
  - 3a. First, some components should be tumbled in the bulk cassette. The time used to tumble the components is determined by a timing parameter set by selecting the correct bulk feeder type (see figure 3.1).
  - 3b. After tumbling, the components will fall down and some will make it to the component transport area (average hit rate higher than 100%). The control unit gives the components some time to fall into this transport area. This time is determined by a timing parameter set by selecting the correct bulk feeder type (see figure 3.1).
  - 3c. Once arrived in the transport area, the components must still travel a long distance before reaching the pick position. To do this, they will be blown forward. This time that components are blown forward is determined by a timing parameter set by selecting the correct bulk feeder type (see figure 3.1).

At the same time, the slider at the pick position moves to the transport area. In this way, the first component in the queue moves into the slider.
  - 3d. After transporting the components, the slider at the pick area brings the component to the pick position and stays there until the component is picked.

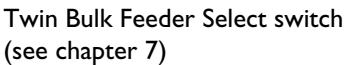


FIGURE 3.1 The timing control part on the PCB.

### 3.2 Human Interface

The human interface can be found at the topside of the rear end of the feeder. This interface is shown in figure 3.2.

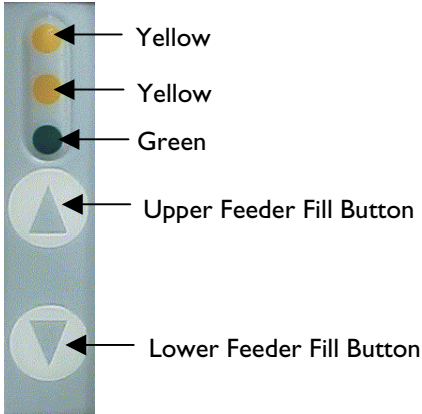


FIGURE 3.2 Human interface

## LEDs

- Yellow: The Yellow LEDs are not used
- Green: If the 12VDC is connected to the twin bulk the green LED will continuously light.

After connecting to 12VDC, the Bulkfeeder will initialize itself for approximately 0.5 second. During this time, the feeder cannot be operated.

Index Buttons



Upper Feeder: When the upper feeder button is pressed it will activate the automatic fill cycle for the upper feeder. This cycle is a number of bulk cassette pulses (differs per bulk feeder component type) and one transport area pulse. (Not applicable to single lane bulk feeders).



Lower Feeder: When the lower feeder button is pressed it will activate the automatic fill cycle for the lower feeder. This cycle is a number of bulk cassette pulses (differs per bulk feeder component type) and one transport area pulse.

3.3 Twin Bulk Feeder Modules

The structure of the twin bulk feeder is shown in figure 3.3. Identification of parts of these modules is done in the following sections. These names are used in all other chapters.

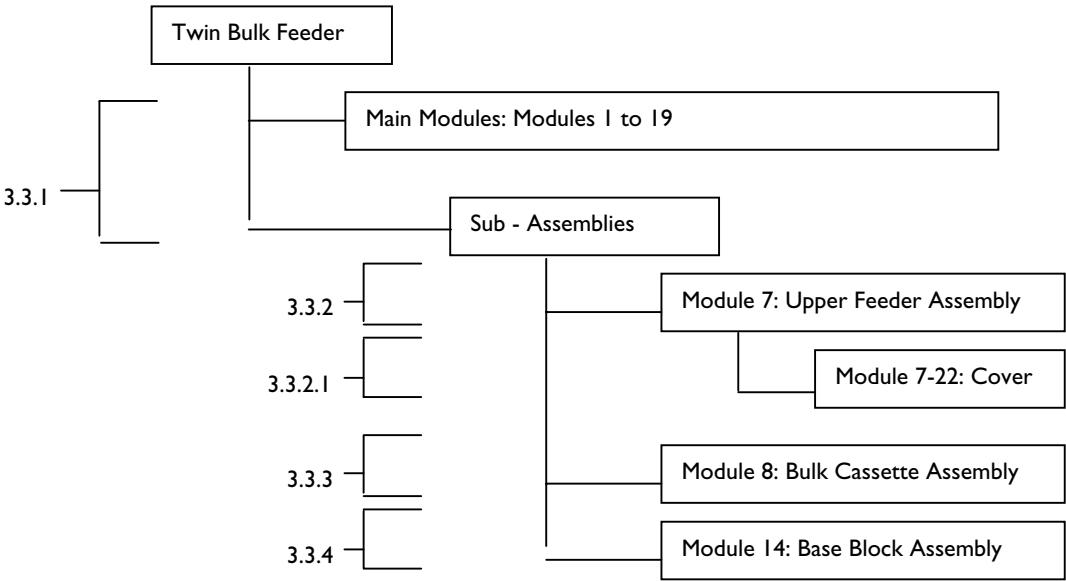


FIGURE 3.3. Twin Bulk Feeder Modules

In addition, although not a part of the twin bulk feeder, a description is added of the bulk case (the case with components as delivered by the component supplier).

### 3.3.1 Twin Bulk Feeder Modules

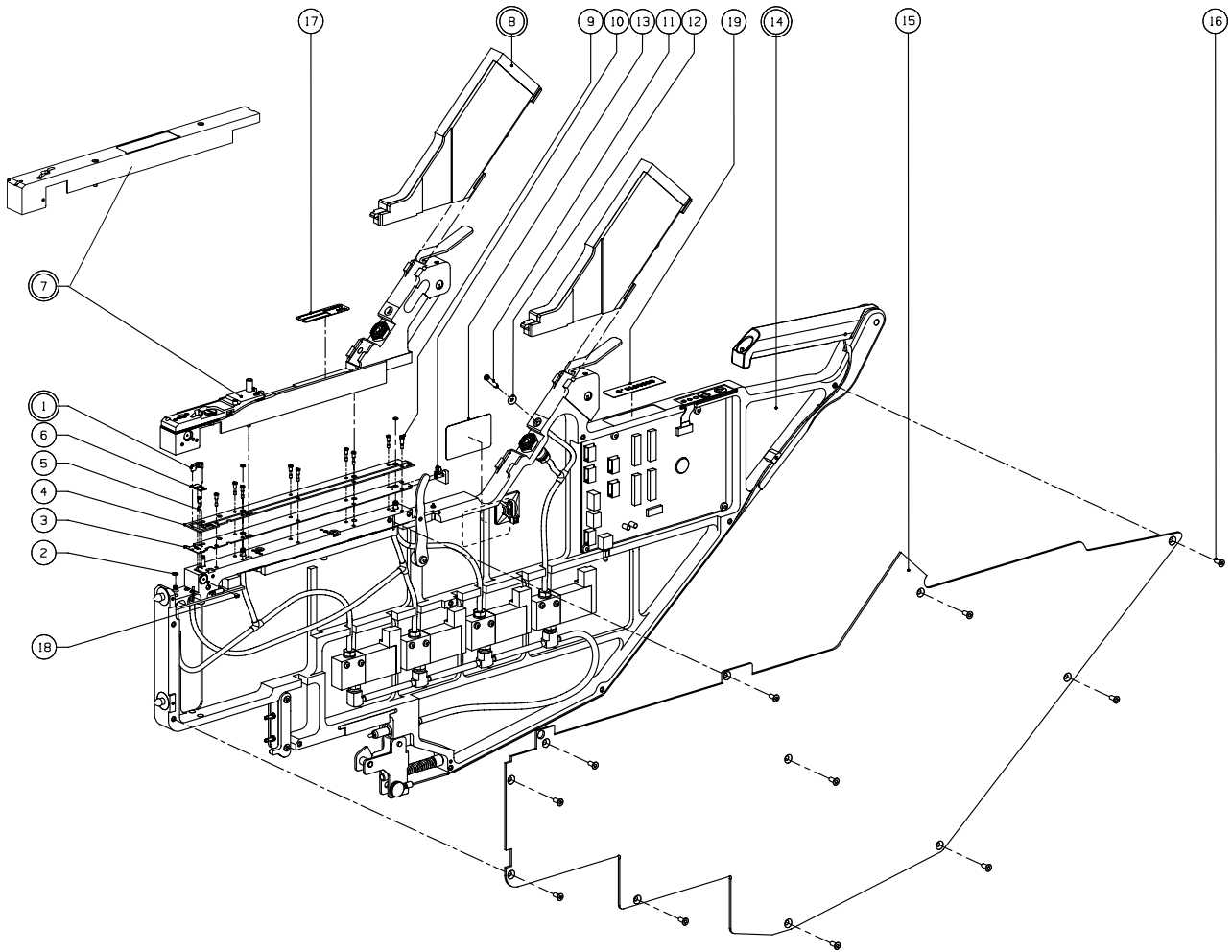


FIGURE 3.3.1

Twin Bulk Feeder Modules

---

## Functional Description

---

Item	Name
1	Fork, Lower Feeder
2	O-Ring 1,8 x 0,7
3	Bottom Plate
4	Product Plate
5	Adaption Screw Low
6	Slider
7	Upper Feeder Assembly (see section 3.3.3, most feeders) Lower Feeder Cover (Single Lane Feeders only)
8	Bulk Cassette (see section 3.3.1.1)
9	Positioning Screw
10	Guide Plate
11	Hose Pillar Restriction
12	O-Ring 2,57 x 1,78
13	Identification Plate
14	Base Block Assembly (see section 3.3.2)
15	Side Plate
16	Screw M2,5 x 6, Sunken
17	Identification Plate, Upper Feeder Cassette identification
18	Set Screw M2x3
19	Color Identification sticker

TABLE 3.3.1

Twin Bulk Feeder Modules

---

### 3.3.2 Upper Feeder Assembly

This module is not available on Single Lane bulkfeeder types.

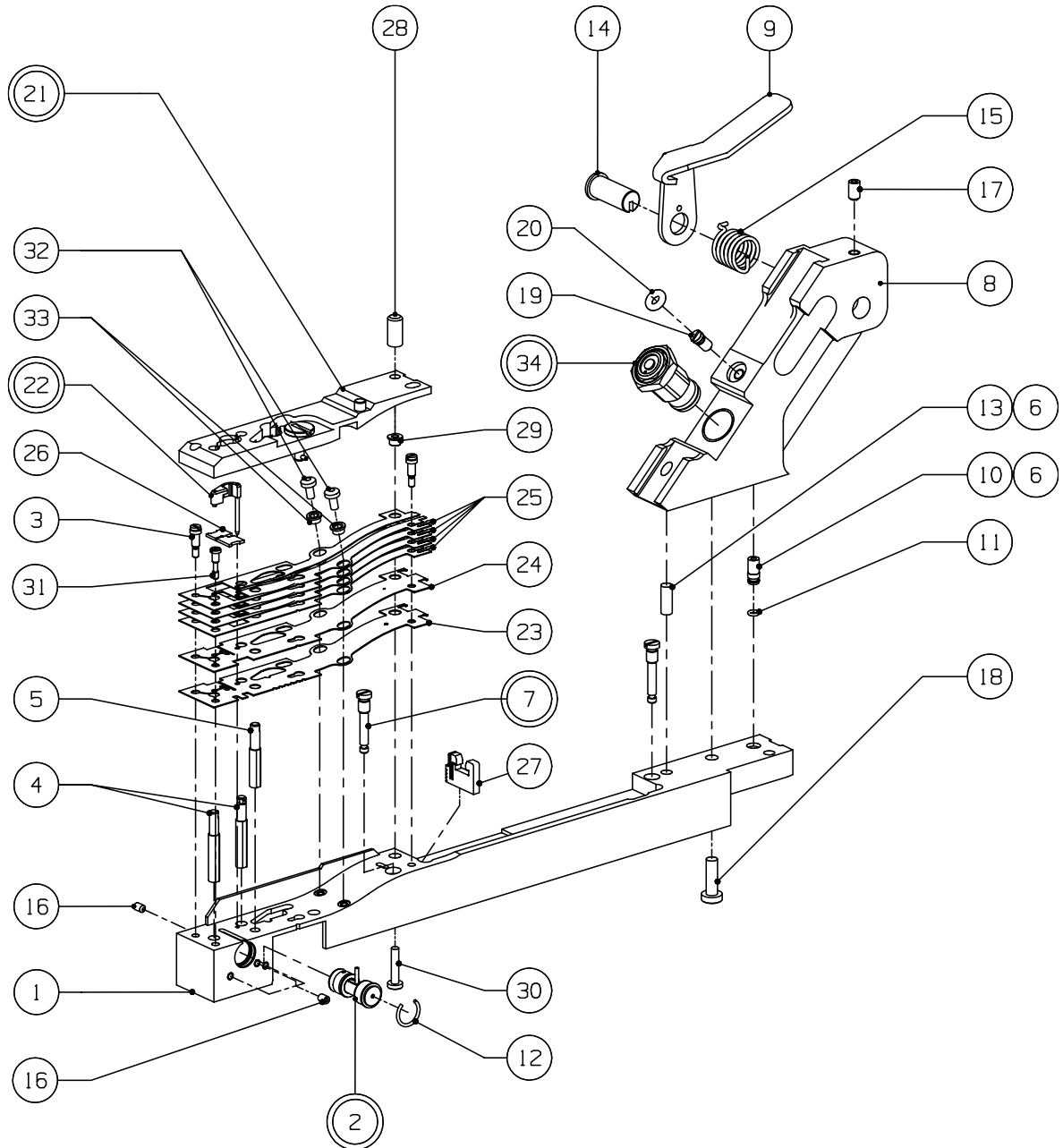


FIGURE 3.3.2

Upper Feeder Assembly

## Functional Description

Item	Name
1	Holder
2	Cylinder
3	Positioning Screw
4	Transmitting & Receiving Sensor, Upper Feeder
5	Transmitting Sensor, Lower Feeder
6	Loctite 638
7	Lock Screw
8	Block
9	Clamp, Bulk Cassette Upper Feeder
10	Nipple
11	O-ring 1,8 x 0,7
12	Circlip RB7
13	Dowel RND3 x 8
14	Bolt, Bulk Cassette Clamp
15	Spring, Bulk Cassette Clamp
16	Set Screw, M2 x 3
17	Set Screw, M3 x 5
18	Screw M3 x 10 Pan Head
19	Restriction M3
20	O-Ring M2,57 x 1,78
21	Cover Assembly (see section 3.3.3.1)
22	Fork, Upper Feeder
23	Bottom Plate
24	Blower Plate
25	Product Plates (multiples)
26	Slider
27	Guide Plate
28	Nut, M2 Curled
29	Centering Nut, M2 Fit
30	Screw M2 x 10 Pan Head
31	Adaption Screw, Low
32	Screw M2 x 4 Pan Head
33	Centering Bush
34	Pusher Cylinder, Upper Bulk Cassette

TABLE 3.3.2

Upper Feeder Assembly

### 3.3.2.1 Cover assembly

This module is not available on Single Lane bulkfeeder types.

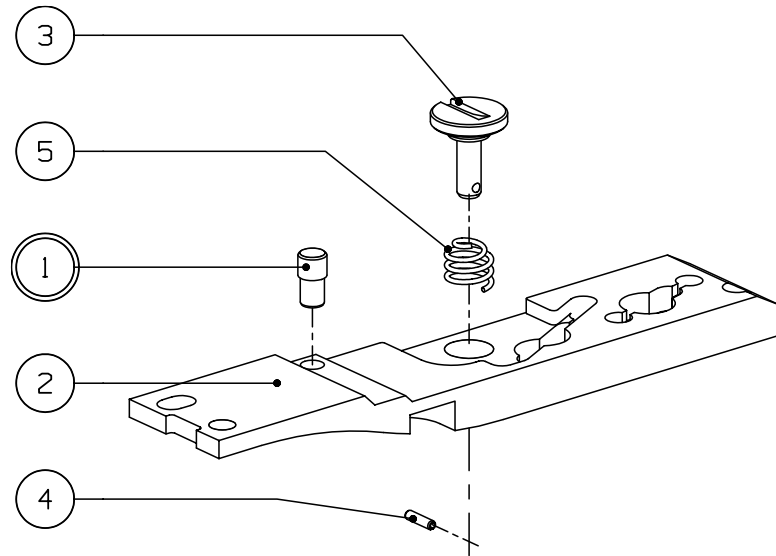


FIGURE 3.3.2.1

Cover Assembly



---

## Functional Description

---

Item	Name
1	X-Pin (the X-Pin has no function of the FCM-II).
2	Cover
3	Lock
4	Spring dowel, RNDI x 4
5	Compression Spring

TABLE 3.3.2.I

Cover Assembly

---

### 3.3.3 Bulk Cassette

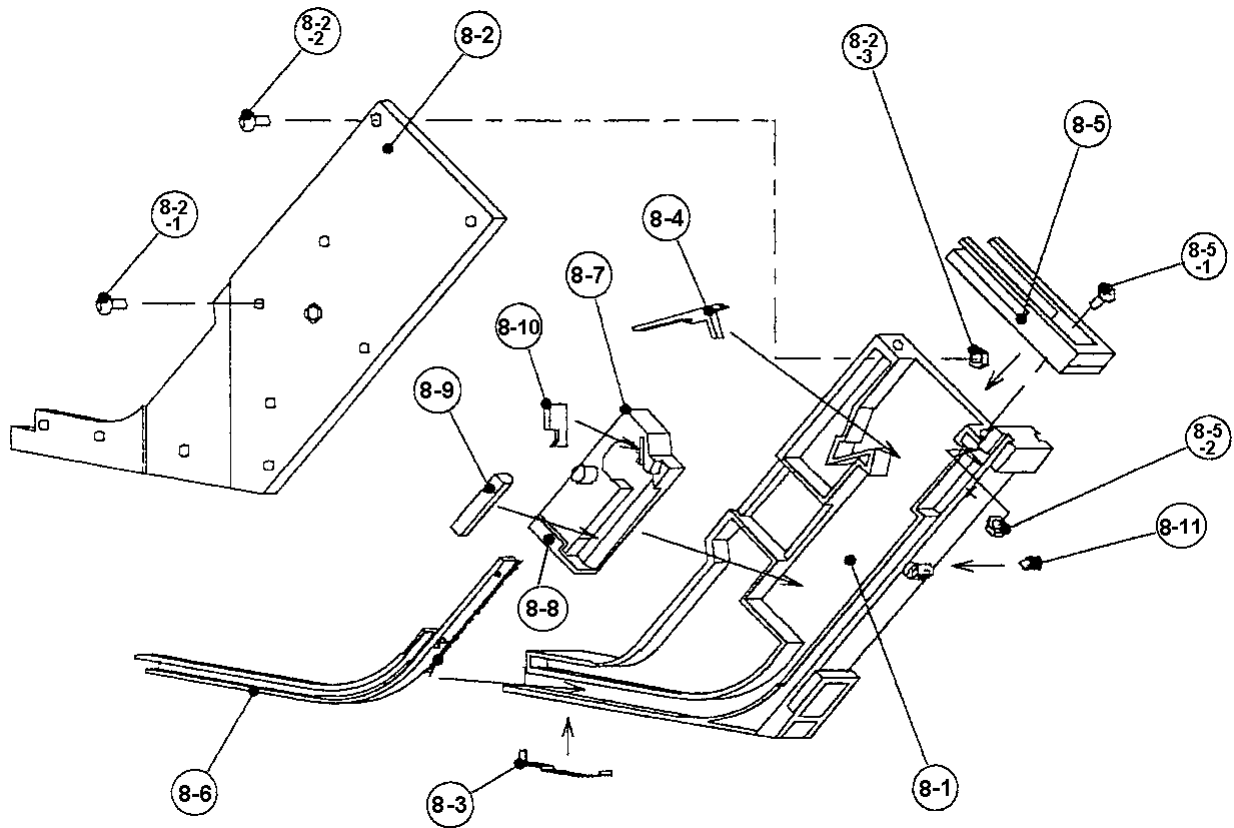


FIGURE 3.3.3.

Bulk Cassette (detailed)



#### CAUTION

Needle, position 8-11, is factory set, do not change or replace this item locally. Changing the setting will negatively influence the performance of the bulk feeder.

---

## Functional Description

---

Item	Name
8-1	Main Body
8-2	Cover, Bulk Cassette
8-2-1	Pan Head Screw M2 x 12
8-2-2	Pan Head Screw M2 x 10
8-2-3	Nut M2
8-3	Component Stopper (not in C0201 Cassette)
8-4	Gate Support Plate
8-5	Bulk Case Holder
8-5-1	Screw Sunken, M2 x 5
8-5-2	Nut M2
8-6	Chute
8-7	Chamber
8-8	Chute Gate
8-9	Moveable Block
8-10	Moveable Gate
8-11	Needle (factory set: Do not change this position)

TABLE 3.3.3

Bulk Cassette part names

Not all parts are applicable to all bulk cassettes or are necessarily located at the same location. It very much depends on the type of components used. See below for a couple of examples.

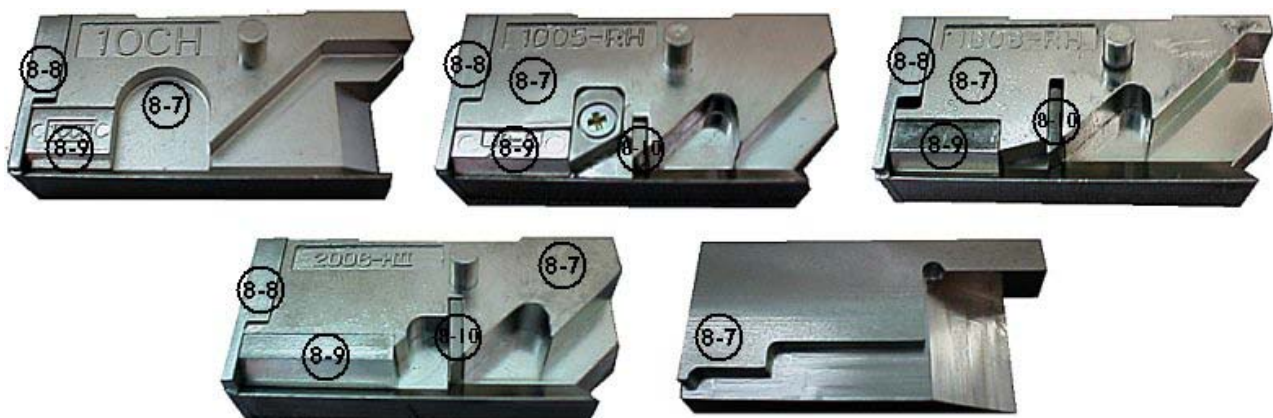


FIGURE 3.3.3b

Variety of parts

### 3.3.4 Base Block Assembly

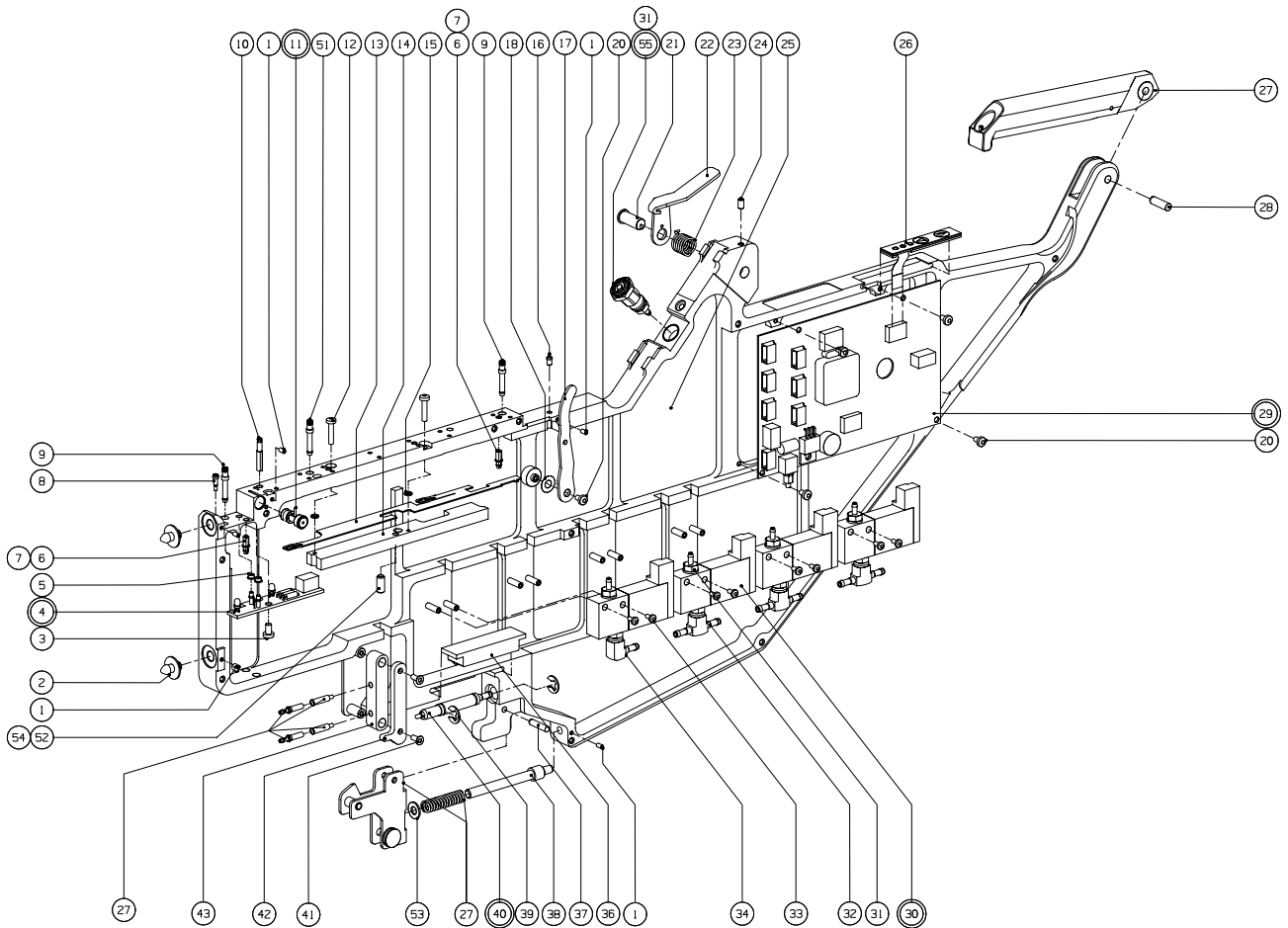


FIGURE 3.3.4a Base Block Assembly Mechanical Parts

## Functional Description

Item	Name
1	Set Screw, M2x4
2	Pin, Feeder Positioning
3	Screw, M3x5 Pan Head
4	Sensor Print Assembly
5	Isolating Bush
6	Nipple M3
7	Loctite 542
8	Positioning Screw
9	Nipple
10	Sensor
11	Cylinder
12	Screw, M2,5 x 12 Pan Head
13	Leaf Spring
14	Strip
15	Spacer
16	Pin
17	Locking Lever
18	Washer, 4,2 x 9 Curved
20	Screw, M2,5 x 4 Pan Head
21	Bolt
22	Clamp
23	Spring
24	Set Screw, M3 x 5
25	Base Block
26	Human Interface
27	Interface Set (includes Handle, contact pins, clamp, and cable).
28	Dowel, Hardened RND 4 x 14
29	Controller Assembly
30	Valve MAC 34B-ABA-GDKA-IBA
31	Hose Pillar CN-M5-PK-2
32	T-Hose Nipple M5
33	Screw, M2 x 4 Pan Head
34	L-Nipple LCN-M5-PK-3
36	Guide Block
37	Dowel hardened RND3 x 14
38	Spring Shaft
39	Circlip BLK4
40	Pneumatic Pen
41	Screw, M2,5 x 6
42	Guide Block
43	Contact Block
52	Pressure Piece
53	O-Ring
54	Loctite 243
55	Pusher Cylinder, Lower Bulk Cassette

TABLE 3.3.4a

Base Block Assembly Mechanical Parts

---

## Functional Description

---

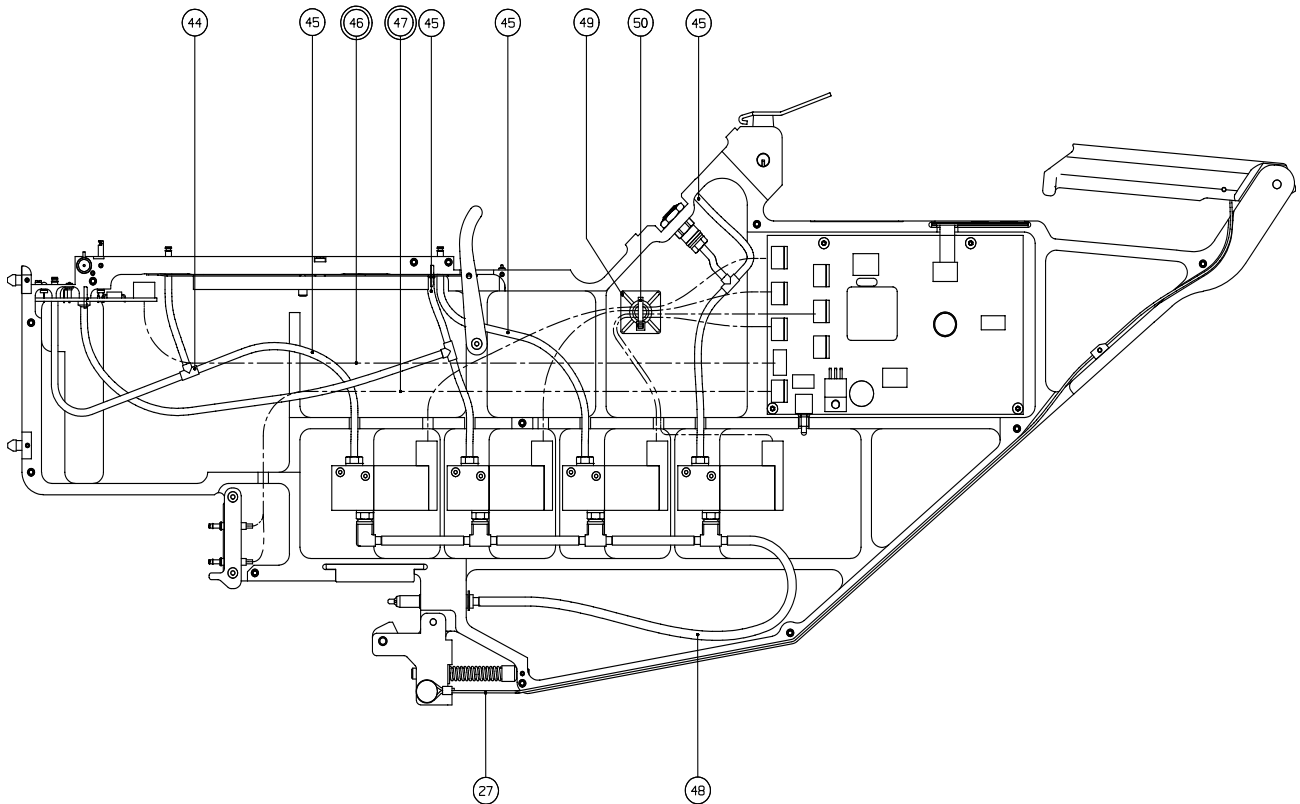


FIGURE 3.3.4b

Base Block Assembly Pneumatic Parts



**NOTE:** When using single lane bulkfeeders, no air is supplied to the upper feeder, reducing the number of required parts for this function (valves, air tubes, cabling to the valves).

---

## Functional Description

---

Item	Name
27	Interface Kit: Cable
44	T-Connector T-PK-2
45	Synthetic Hose PU2
46	Sensor Cable Assembly (Flat Cable)
47	Power Cable Assembly
48	Hose 4 x 25
49	Tie Holder Self Adhesive
50	Wire tie 2,2 x 80 mm

TABLE 3.3.4b

Base Block Assembly Pneumatic Parts

---

## Functional Description

### 3.3.5 Bulk Case

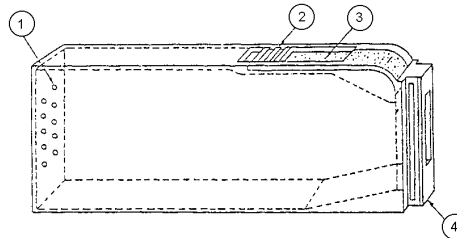


FIGURE 3.3.5 Bulk Case (not part of bulk feeder)

Item	Name
1	Holes
2	Knob
3	Shutter, component release
4	Coupled Portion

TABLE 3.3.5. Bulk Case Part Names

#### Bulk Case:

- Bulk Cases should comply to the EIAJ ET-7201 bulk case specifications.
- The components inside the bulk case must match the dimensions (including tolerances) as specified in table 3.3.5

PA Number	Bulk cassette	Component			
		Type	Length (mm)	Width (mm)	Thickness (mm)
PA2648/00	0603C	C0201 (0603C)	0.57 - 0.63	0.27 - 0.33	0.27 - 0.33
PA2648/35	2012-125	C0805T1.25 (2012C)	1.90 - 2.10	1.15 - 1.35	1.15 - 1.35
PA2648/45	20M	MELF 0805	1.90 - 2.10	Ø 1.15 - 1.35	
PA2648/50	1005C	C0402 (1005C)	0.95 - 1.05	0.45 - 0.55	0.45 - 0.55
PA2648/60	1005R	R0402 (1005R)	0.95 - 1.05	0.45 - 0.55	0.30 - 0.35
PA2648/70	1608C	C0603 (1608C)	1.53 - 1.67	0.73 - 0.87	0.73 - 0.87
PA2648/80	1608C	R0603 (1608R)	1.55 - 1.70	0.70 - 0.90	0.40 - 0.48
PA2648/85	16M	MELF 0604	1.50 - 1.70	Ø 0.90 - 1.10	
PA2648/90	2012-06	C0805T0.6 (2012C)	1.90 - 2.10	1.15 - 1.35	0.50 - 0.70
PA2648/95	2012-06	R0805	1.90 - 2.10	1.15 - 1.35	0.50 - 0.70

TABLE 3.3.5 Twin Bulk Feeder, Bulk Cassette and component combination.



**NOTE:** It is known that component suppliers do not always deliver components according to specified dimensions. It is recommended to request a component specification verification report from your component supplier. Check also chapter 5 for a definition of a good type of bulk component.



## CHAPTER 4 Maintenance

### 4.1 Preventive Maintenance Schedule

The daily check consists of:

- Check, before use, if the component is located correctly in the feeder.
- When the bulk feeder has not been used for a long time, check for dirt, dust or damaged components in the pick positions.
- Check the bulk case before use for damage, dirt and dust.

Item	Daily	Weekly	Operating Hours				Replacement	Check
			500	1500	3000	6000		
Complete Feeder								
■ Repair							10 million placements	
■ Replace							50 million placements	
Pick Stations								
■ Check	0.1 min							
■ Clean			4 min					
■ Repair							10 million placements	
Transport Area								
■ Check							During Cleaning	
■ Clean				4 min				
■ Repair							10 million placements	
Pick Sensors								
■ Clean			1 min					
Bulk Cassette								
■ Check	0.1 min							
■ Replace							5 million placements	

TABLE 4.1. Preventive Maintenance Schedule



#### WARNING

**Under no circumstances use of alcohol, grease, oil or any other chemical should be used. Chemicals in any component area will severely decrease the performance of the bulk feeder permanently.**

## 4.2 Corrective Maintenance Schedule

In general, parts need only to be exchanged when defective. The typical lifetime of a bulk feeder exceeds 10 million placements (up to 50 million possible). This can only be achieved when the feeder is kept in a clean and proper condition and when parts of the feeder are replaced within the above mentioned preventive maintenance schedule.

The typical lifetime of a bulk cassette is 5 million component presentations and needs to be replaced completely (all parts subject to wear).

For extending the lifetime of the twin bulk feeder, it is recommended to return the feeder to Philips every 10 million placements. When handled correctly, a lifetime up to 50 million placements is possible.

Feeder	Replace / Repair Frequency
Complete Feeder	
■ Repair	10 million placements (to be returned to Philips)
■ Replace	50 million placements
Bulk Cassette	
■ Replace	5 million placements

TABLE 4.2.

Corrective Maintenance Schedule

---

Replacement instructions for parts that can be replaced locally can be found in Chapter 6.

## 4.3 Maintenance

### 4.3.1 Maintenance: Pick Station and Transport Area

#### 4.3.1.1 Upper Feeder

- Remove all components from the transport area and the component at the pick position.
- Clean the transport area with a soft camelhair brush (normally used for camera lenses). Avoid scratches and dust and do not use lubricants and cleaning chemicals.
- Clean the bottom side of the cover with the same soft camelhair brush.

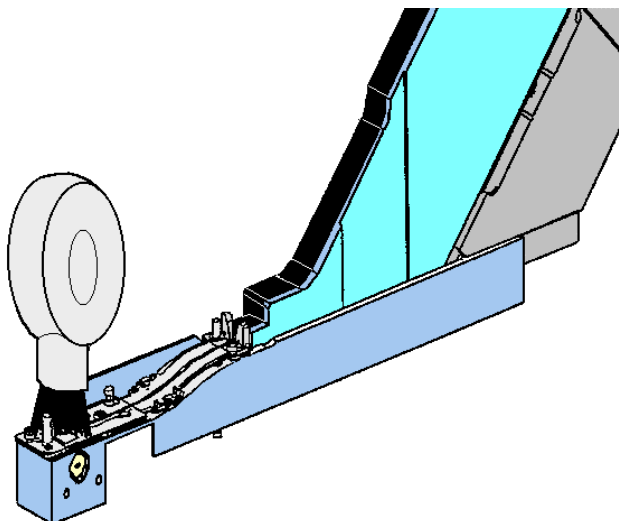


FIGURE 4.3.1.1

Upper Feeder Maintenance.

- Before adding the top cover, make sure there are no components located on top of the product plates, in the transport area or at the bottom of the top cover.



### WARNING

- 1 Under no circumstances use of alcohol, grease, oil or any other chemical should be used. Chemicals in any component area will severely decrease the performance of the bulk feeder completely
- 2 Components that get squeezed between the product plate and the cover during assembly cause unnecessary damages to the feeder and lead to non-performance of the feeder. Furthermore, the height of the feeder changes which may lead to unnecessary crashes against the placement head of the host system

- If not done already, clean the transport area of the lower feeder as described in section 4.3.1.2.

### 4.3.1.2 Lower Feeder.

- Remove the upper feeder. This is described in chapter 2.4.3.2.
- Remove all components from the transport area and the component at the pick position.
- Clean the transport area with a soft camelhair brush (normally used for camera lenses). Avoid scratches and dust and do not use lubricants or cleaning chemicals.
- Clean, with the same soft camelhair brush, the bottom side of the upper feeder.

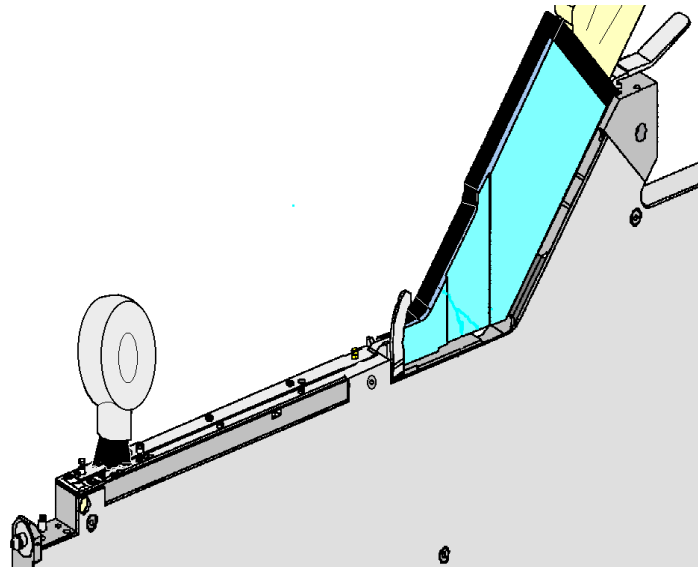


FIGURE 4.3.1.2

Lower Feeder Maintenance.

- Before adding the upper feeder, make sure there are no components located on top of the product plates, in the transport area or on the bottomside of the upper feeder assembly.



### WARNING

- 1 Under no circumstances use of alcohol, grease, oil or any other chemical should be used. Chemicals in any component area will severely decrease the performance of the bulk feeder completely
- 2 Components that get squeezed between the product plate and the cover during assembly cause unnecessary damages to the feeder and lead to non-performance of the feeder. Furthermore, the height of the feeder changes which may lead to unnecessary crashes against the placement head of the host system

- If not done already, clean the transport area of the upper feeder as described in section 4.3.1.1.

#### 4.3.2 Maintenance: Sensors.

- Clean the sensors by means of a small brush (do not use cleaning chemicals!).



**NOTE:** When the top cover or upper feeder is removed, take note of the warning messages as described in the previous section: **Make sure there are no components left in the transport area, on the product plates or on the bottom side of the top cover.**

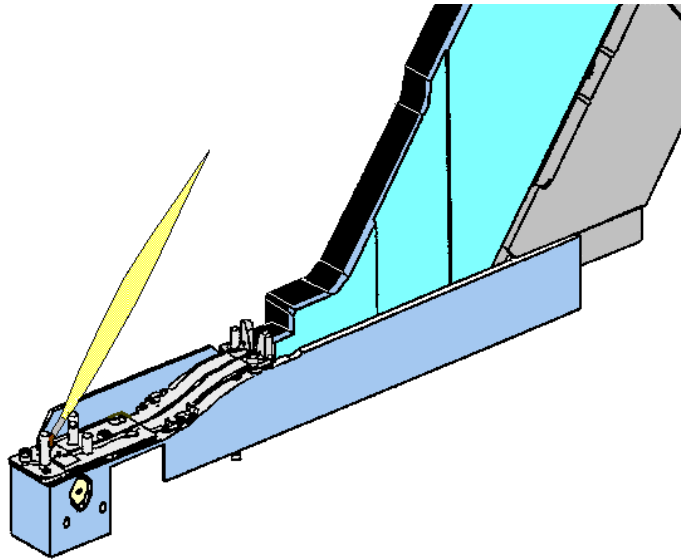


FIGURE 4.3.2a Upper Feeder Sensor Maintenance.

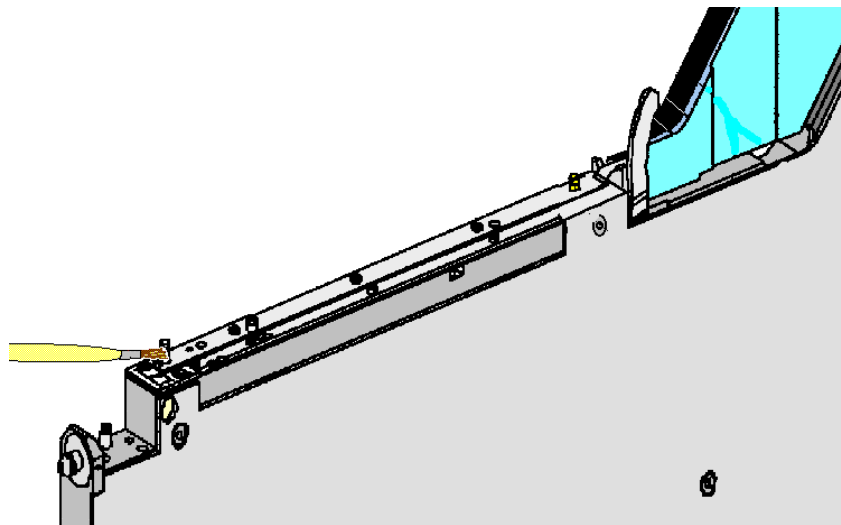


FIGURE 4.3.2b Lower Feeder Sensor Maintenance.

### 4.3.3 Maintenance: Bulk Cassette.

During the normal lifetime of the bulk cassette, this cassette normally requires no additional maintenance. Due to process reasons, it can occur that dirt, dust, moist has entered the cassette.



#### WARNING

**Once moist, lubricant or any chemical has entered the bulk cassette, it will contaminate the complete feeder (up to the pick point) as the substance is spread by the movement of the components. It will seriously degrade the performance of the bulk feeder. In this case, all parts must be removed, cleaned and must be completely dry before assembling the feeder back together.**

- If dirt is detected, clean the cassette with a brush or with an air gun (dry, dust and moist free air only!). Do not perform this operation near the machine or near the bulk feeder (as dust may be blown into they system or other bulk feeder parts).
- If moist, lubricants or chemicals is detected, follow the instructions in section 6.5.2. for cleaning the bulk cassette parts. Make sure other parts of the feeder are not contaminated with the same moist, lubricant or chemical.

---

## **Maintenance**

---

**Intentionally left blank**

---



---

**CHAPTER 5 Trouble Shooting**

---

**5.1 Introduction**

The following sections give an overview of problem types that can be experienced at the machine. It will relate the problem cause and the remedy to solve this problem.

**5.1.1 General Check point**

Whatever error occurs on the bulk feeder, all of them will lead to automatic or manual refires. Therefore, searching for the cause can be complicated. To avoid overlooking the obvious issues, the following general aspects should be always checked first:

Probable Cause	Remedy	Section
Air pressure not 5.5 Bar	Set to 5.5 Bar	(see FCM manuals)
Voltage not 12VDC	Correct to 12VDC	(see FCM manuals)
Wrong component dimensions	Ask for component size verification sheet from your component supplier.	1.2
Component Case closed	Open component case	2.3.3
Wrong components used	Remove wrong components and add correct components	1.2, 1.3
Wrong Bulk Cassette used	Remove wrong bulk cassette and add correct bulk cassette.	1.2, 1.3
Switch on the PCB is in the OFF position	Set switch to ON position.	9.1.1

TABLE 5.1.1.

Obvious error causes

---

---

## Trouble Shooting

---

### 5.1.2 Automatic and Manual Refire Level too high.

#### 5.1.2.1 Lifetime Causes

Probable Cause	Remedy	Section
Multiple of 5.000.000 picks realized	Replace bulk cassette	4.1
Multiple of 10.000.000 picks realized	Send Feeder back for upgrade/repair	4.1
50.000.000 picks realized	Replace Bulk Feeder completely	4.1

TABLE 5.1.2.1. Lifetime Causes

---

#### 5.1.2.2 Logical Causes

Probable Cause	Remedy	Section
Bulk Case Empty	Insert New Bulk Case	2.3.2
Transport area not filled with components.	Transport components to pick position	2.3.1
Components stuck: <ul style="list-style-type: none"><li>■ Wrong Component size</li><li>■ Bridging</li><li>■ Obstruction</li></ul>	Solve Problem according section 5.2.1.1 and onward	5.2.1.1
Sensors Dirty (no index after pick)	Clean Sensors	4.3.2.1
Component dropped of nozzle and is in front of sensor	Remove component	n.a.
Component On Edge at Pick position	Remove component, then press <i>upper</i> or <i>lower feeder</i> button once.	5.2.1.1
Feeder inserted into machine with component in pick position.	Insert feeder first, then index component to pick position.	5.2.1.3

TABLE 5.1.2.2. Obvious error causes

---

## Trouble Shooting

### 5.1.2.3 Complex Causes

Probable Cause	Remedy	Section
Feeder does not index after pick: <ul style="list-style-type: none"> <li>■ Sensors defective</li> <li>■ Sensor cable defective</li> <li>■ Sensor print defective</li> <li>■ Sensor blocked or dirty</li> <li>■ PCB defective</li> <li>■ Valve defective</li> <li>■ Leak in air tubing</li> </ul>	<ul style="list-style-type: none"> <li>■ Replace sensors</li> <li>■ Replace sensor cabling</li> <li>■ Replace sensor print</li> <li>■ Clean sensor (path)</li> <li>■ Replace print</li> <li>■ Replace valve</li> <li>■ Replace air tubing</li> </ul>	6.3.1 6.6.17 6.6.2 4.3.2 6.6.10 6.6.11 6.6.16
Feeder does not go ON <ul style="list-style-type: none"> <li>■ Contact Pins missing/damaged</li> <li>■ Wiring defective</li> <li>■ PCB defective</li> <li>■ Green Led defective only</li> </ul>	<ul style="list-style-type: none"> <li>■ Add/replace contact pins</li> <li>■ Replace wiring</li> <li>■ Replace PCB</li> <li>■ Replace Human interface.</li> </ul>	6.6.15 6.6.17 6.6.10 6.6.8
Frequent Y-Pick Offsets <ul style="list-style-type: none"> <li>■ Feeder not pushed good onto interface</li> </ul>	<ul style="list-style-type: none"> <li>■ Push feeder firm into position.</li> </ul>	2.3.4.
Human interface does not index, but pick does: <ul style="list-style-type: none"> <li>■ Human interface (cable) defective</li> <li>■ Print (connector) defective</li> </ul>	<ul style="list-style-type: none"> <li>■ Replace Human interface</li> <li>■ Replace PCB</li> </ul>	6.6.8 6.6.10
Components sticking to each other in cassette: <ul style="list-style-type: none"> <li>■ Moist, lubricant or chemical in cassette.</li> <li>■ Components statically charged.</li> </ul>	<ul style="list-style-type: none"> <li>■ Clean entire feeder and dry entire feeder.</li> <li>■ Contact component supplier.</li> </ul>	Various.
Components in lane, but trouble in forwarding: <ul style="list-style-type: none"> <li>■ Component shape not good</li> <li>■ Component has 'tin-hair' on tin head.</li> <li>■ Components too thick.</li> </ul>	<ul style="list-style-type: none"> <li>■ Remove component</li> <li>■ Remove component</li> <li>■ Contact component supplier</li> </ul>	

(continue next page)

## Trouble Shooting

(Complex Causes, continued)

Probable Cause	Remedy	Section
Very High Automatic Refire Level. Feeder seems to index and power seems OK:	Replace Bulk Feeder completely	
■ Component path damaged	Send feeder for repair	8.2
■ Component path dirty	Clean feeder path	4.3
■ Upper Feeder not closed completely by clamp.	Clamp upper feeder correctly. Check for dirt.	2.4.3.2
■ Slider/Cylinder not working or too slow or too quick		
■ Valve defective	■ Replace Valve	6.6.11
■ Air leakage	■ Replace air tubing	6.6.16
■ Cylinder defective	■ Send feeder for repair	8.2
■ Slider damaged	■ Replace slider	6.2.2, 6.3.8
■ Air pressure wrong	■ Check air supply (5.5 bar)	n.a.
■ Top cover not closed correctly		
■ Curled nut missing	■ Add curled nut	6.3.9
■ Not closed	■ Close Cover	2.4.3.2.
■ Air pulses insufficient		
■ Restrictions dirty	■ Clean/Replace restrictions	6.2.5, 6.3.5
■ Air leakage	■ Replace defective hose	6.6.16
■ Air Supply insufficient	■ Check Air supply (5.5 bar)	n.a.
■ Component not a 'good' bulk component	■ Contact component manufacturer	5.2.1.5
<b>Moist, Oil, Greasy:</b>		
■ Air dryer / filter FCM defect	■ Replace FCM dryer/filter and clean entire bulk feeder	5.3.2
<b>Environmental Issues</b>		
■ (micro) moist on components	■ Components under influence of temperature variations.	5.3.1

TABLE 5.1.2.3.

Complex Causes

### 5.2 Errors when running production

#### 5.2.1 Possible problem area's

Table 5.2.1a and Figure 5.2.1b identify possible obstruction and component bridging areas:

##### Obstruction:

- Components differ from the required dimensions:
  - Width
  - Height
  - Length
  - Shape: Rough, Broken, Tin Layout, Square form.



**NOTE:** It is very important to have the correct size of components as mentioned in Chapter 1. During ordering of components at your component supplier, please request for a component size verification sheet for the delivered components.

##### Bridging:

A common process of bulk is; When a lot of components want to fall through a small hole at the same time, they will all interfere with each other: No component will fall through.

Most of the time, the air pulse and internal pusher are sufficient to solve this problem. However, many components can fall down in different ways, giving a possibility of that combination of fallen components, which cannot be resolved by just blowing.

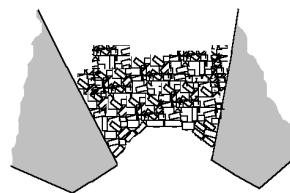


FIGURE 5.2.1a

Bridging

## Trouble Shooting

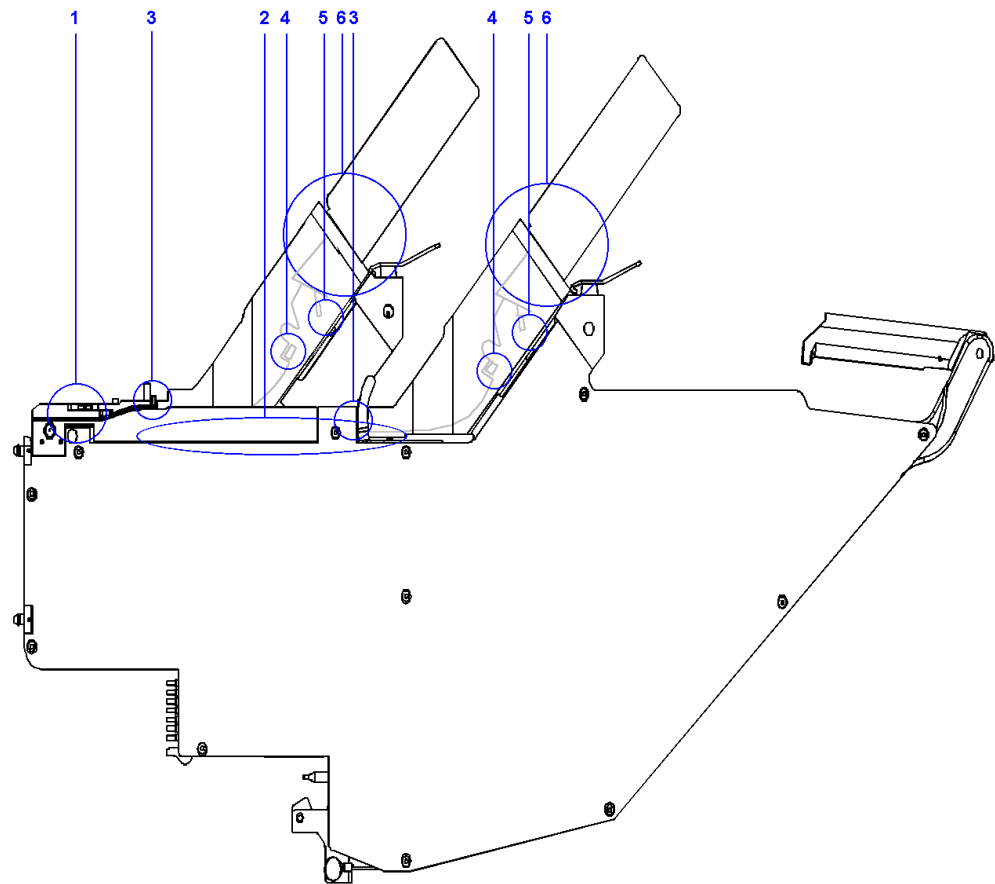


FIGURE 5.2.1b

Bridging

Position	Name	Possible Error	
		Obstruction	Bridge
1	Pick Positions	✓	
2	Transport Area	✓	
3	Guide Plate Area	✓	
4	Moveable Block Area	✓	✓
5	Moveable Gate Area and Air Pulse Area		✓
6	Bulk Case to Bulk Cassette		✓

TABLE 5.2.1

Common Obstruction or Bridging areas

---

## Trouble Shooting

---

For finding the source of the problem quickly, check the error causes of table 5.2.1 in reverse order:

1. Recoverable error at the pick position (section 5.2.1.1.)
2. Check for bridging in the bulk case area (section 5.2.1.2.)
3. Check for bridging at the moveable gate (section 5.2.1.3.)<sup>1</sup>
4. Check for bridging at the moveable block (section 5.2.1.4.)<sup>1</sup>
5. Unrecoverable error at pick position or check for obstruction in the transport area (section 5.2.1.5)

### 5.2.1.1 Pick Position: Recoverable obstructions

Possible errors at the pick position:

- Half component
- Component On-Edge
- Component Tomb-stoned

If the component cannot be removed by means of a retry then follow the following steps:

- Remove feeder from the trolley.

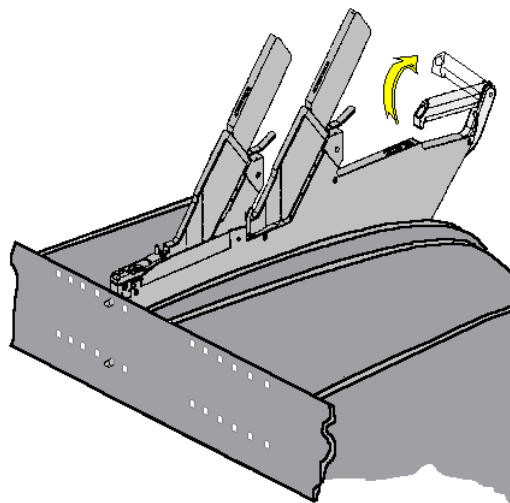


TABLE 5.2.1.1a

Open handle fully

---

<sup>1</sup> Not all bulk cassettes are equipped with a moveable gate or moveable block.

---

## Trouble Shooting

---

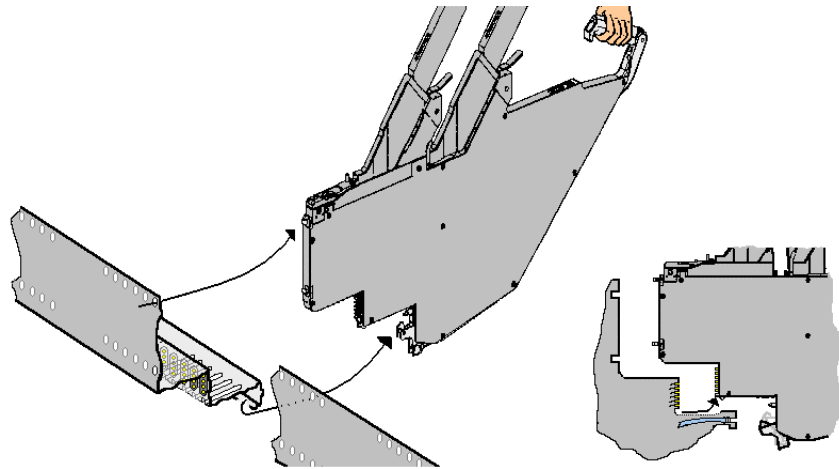


TABLE 5.2.1.1b

Take feeder out of the trolley

---

- Flip the feeder upside down. If the pick position contained an On-Edge or Tomb-stoned component, this faulty component will fall out of the pick position (together with the component of the other pick position).
- After flipping the feeder upside down, check if your problem was solved.

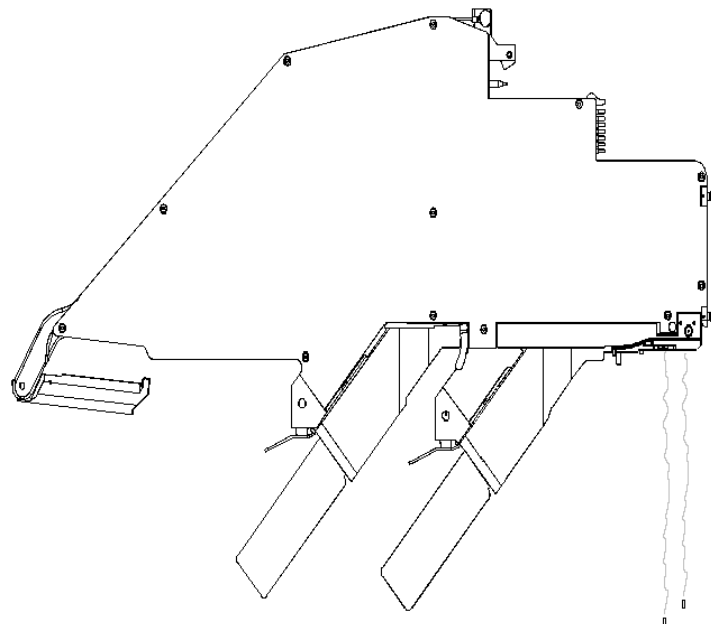


TABLE 5.2.1.1c

Flipping the feeder upside down.

---



### 5.2.1.2 Obstruction: From Bulk Case to Bulk Cassette



**TIP:** Recognition (see figure 5.2.1.2):

- Components still in the case
- No component in pick position
- No components in transport area
- No components in bulk cassette
- Indexing the feeder does not change the situation. No movement in components.

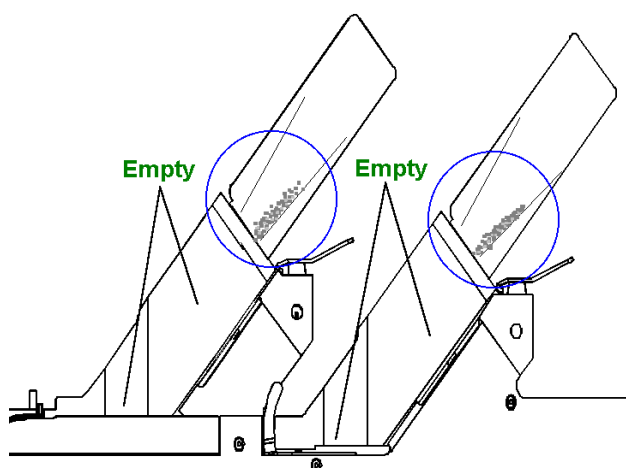


FIGURE 5.2.1.2

Recognizing error caused by components still in bulk case

#### Solution:

(Check first if the knob of the bulk case was open)

- The solution to this problem is by slightly tapping the bulk case. The components usually fall down.
- The transport area is empty, fill the feeder according the fill procedures as described in chapter 2.



**TIP:** With thicker sized components this symptom may occur more than with other, smaller, type components. However, if this symptom always occurs, check for moist in cases, static charge or other cause. Act according to the cause (is storage area too moist, how does the supplier deliver components, and so on).

### 5.2.1.3 Obstruction: At moveable gate



**TIP:** Recognition (see figure 5.2.1.3):

- Components still in the case
- No component in pick position
- No components in transport area
- No components at moveable gate (see next section).
- Indexing the feeder does not change the situation. No movement in components.

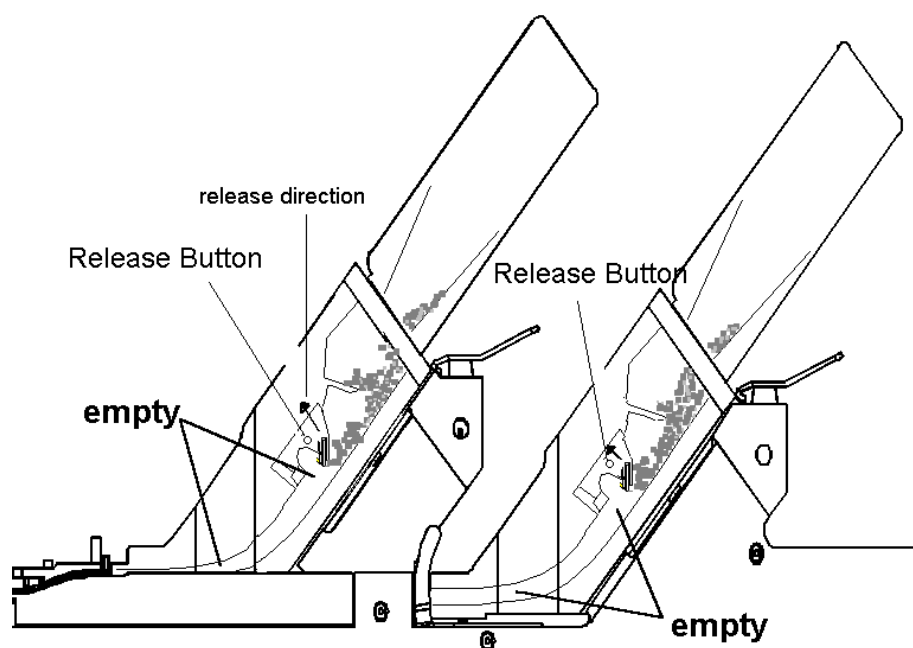


FIGURE 5.2.1.3a

Recognizing error caused by components stuck at moveable gate

#### Solution:

- Press the index switch of the applicable feeder. If it does not solve the obstruction, continue with the next point.
- Slightly tap the bulk case. If it does not solve the obstruction, continue with the next point.
- Move the component release button on the bulk cassette in shown direction. Index air during this action (see figure 5.2.1.3a). If it does not solve the obstruction, continue with the next point.
- Remove the suspected bulk cassette (with bulk case) from the bulk feeder. This can be either the upper or lower feeder bulk cassette.

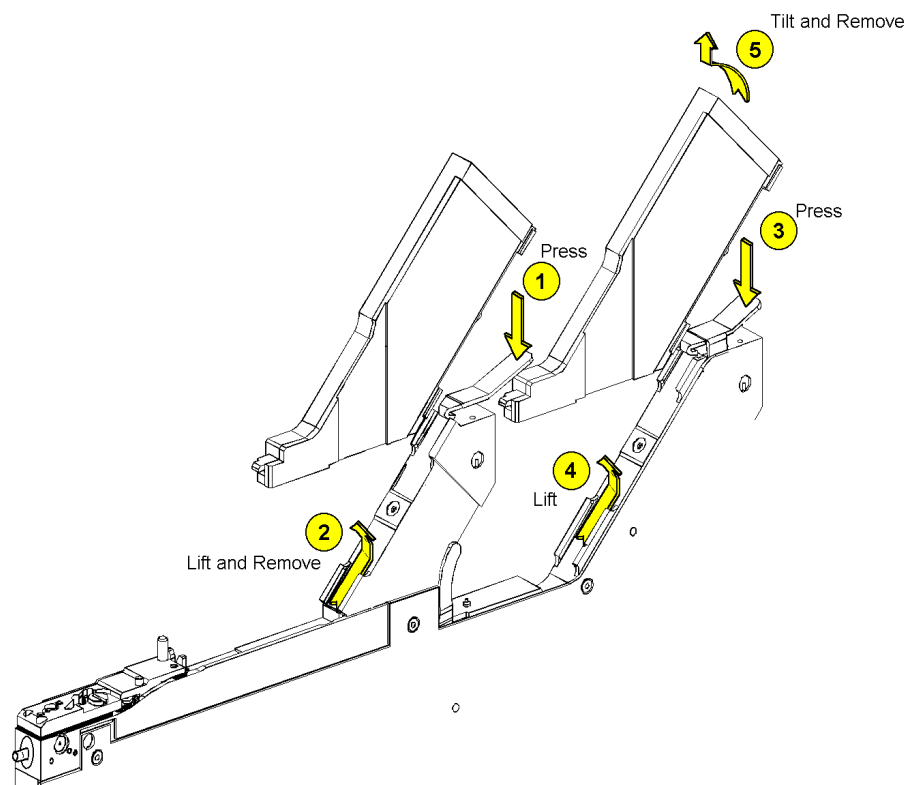


FIGURE 5.2.1.3b

Bulk Cassette removal

- Remove the obstruction according to the **GOOD** example of figure 5.2.1.3c or do this according to figure 5.2.1.3d.

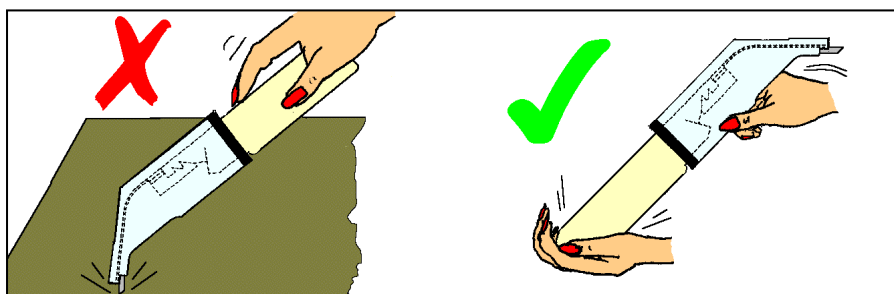


FIGURE 5.2.1.3c

Removing the obstruction the **wrong** and the **good** way.

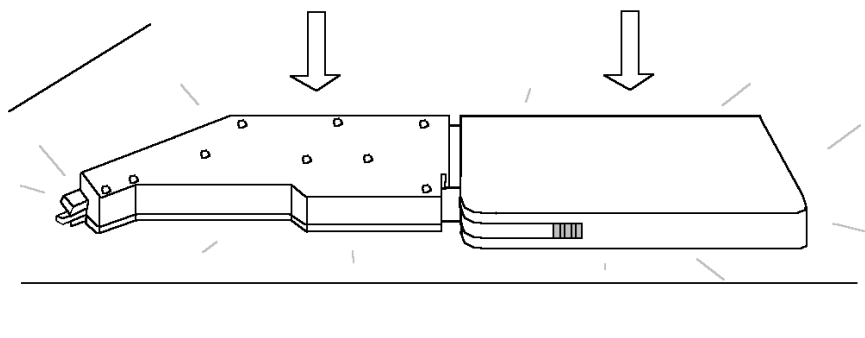


FIGURE 5.2.1.3d

Another **good** way to remove the obstruction

- Before placing the bulk cassette back onto the feeder, make sure there are no components in the entrance of the transport area.



### CAUTION

Objects that remain behind in the transport path will be pressed aside into the cover of the bulk cassette during insertion of this cassette. This leads to damages in the component path, seriously degrading the performance of the feeder.

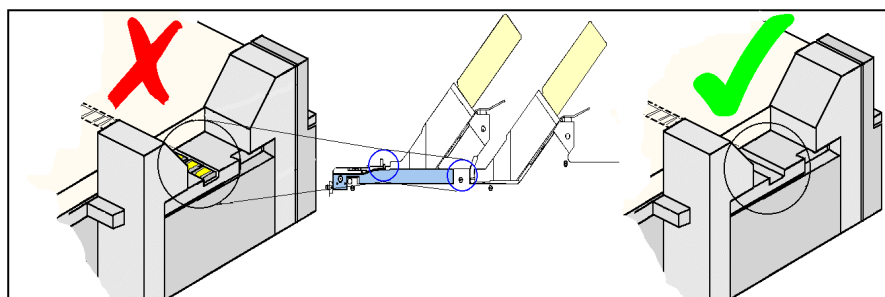


FIGURE 5.2.1.3e

Removing the components from the transport area entrance

- Place the bulk cassette back onto the feeder (reverse action of figure 5.2.1.3b). **Never use force during this action.**
- If the feeder obstruction is solved off-line, make sure that there is no component at the pick position before inserting the feeder into the feederbar. Flip feeder upside down to remove these components.

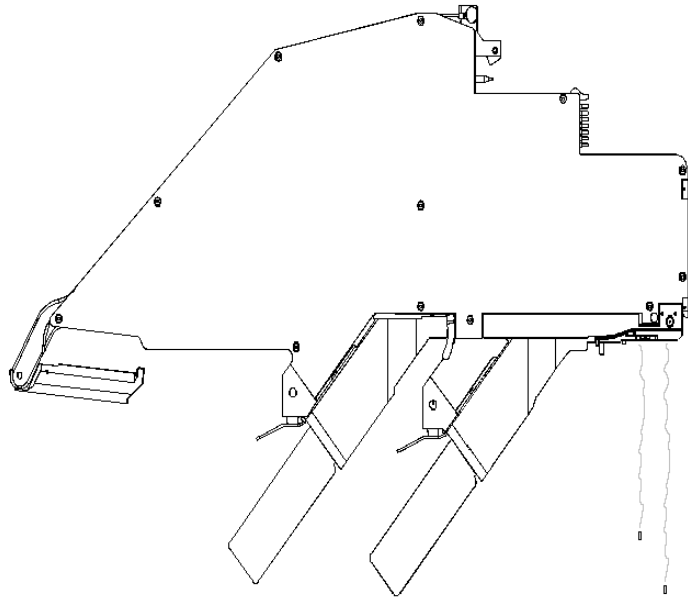


FIGURE 5.2.1.3f. Remove components from pick positions when handled off-line

- Index the both the upper and lower feeder for approximately 2 seconds to fill the transport area and pick position.

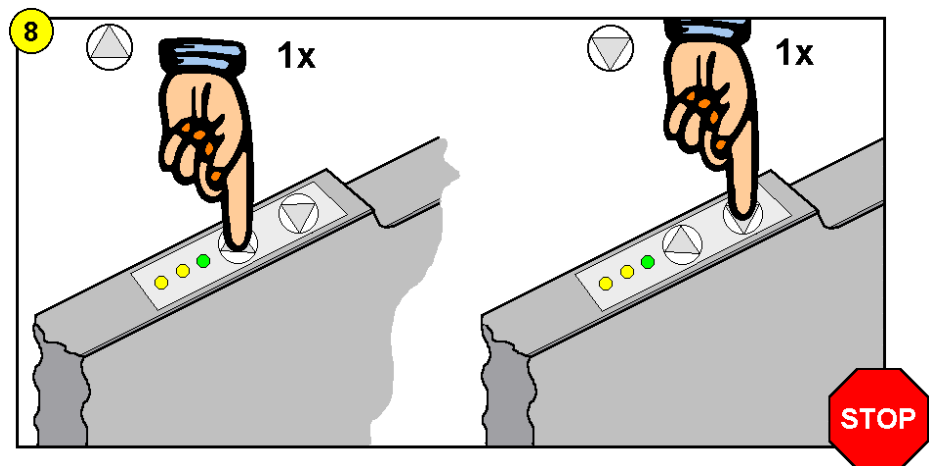


FIGURE 5.2.1.3g. Index upper and lower feeder after to fill the transport area and pick position.

### 5.2.1.4 Obstruction: At moveable block



**TIP:** Recognition (see figure 5.2.1.4):

- Components still in the case
- No component in pick position
- No components in transport area
- Indexing the feeder does not change the situation. No movement in components.

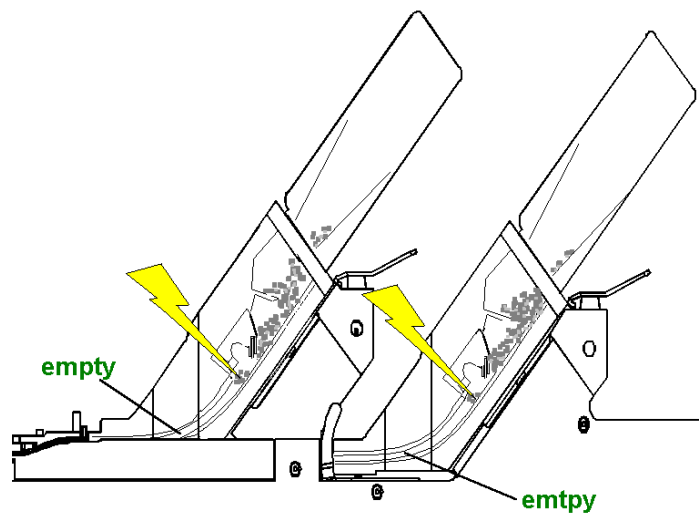


FIGURE 5.2.1.4

Obstruction at moveable block

#### Solution:

The method of solution is not different of that described for 'obstruction at the moveable gate' (see chapter 5.2.1.3). Therefore, use the same solution steps as described in this section.

### 5.2.1.5 Pick Position / Transport area: Unrecoverable obstructions at pick position or obstruction in transport area.

Possible errors at the pick position:

- Solder Tin (or solder heads / termination)
- Half (broken) components.
- Dirt, debris or other material between components

Possible errors in the transport area:

- Components skewed because of too much different sizing of components
- Component dimensions wrong (too big, too small).
- Rough component.



**NOTE:** This symptom is more likely to occur with smaller sized components than larger sized components (starting with 0402/1005 component types).

- Check section 5.2.1.1. first to find out if the error is at the pick position. Also check all previous sections first for obstructions at the bulk case and bulk cassette.
- If flipping the feeder has not solved the problem at the pick position (as suggested in section 5.2.1.1), then the problem can be in either the pick position or in the transport area. Solving both error types is done in the same way:
  - **Pick 1:** If the problem is at pick position 1, then remove the top cover only.
  - **Pick 2:** If the problem is at pick position 2, then remove the complete upper feeder.

Removing the cover and/or upper feeder is shown in figure 5.2.1.5a.

## Trouble Shooting

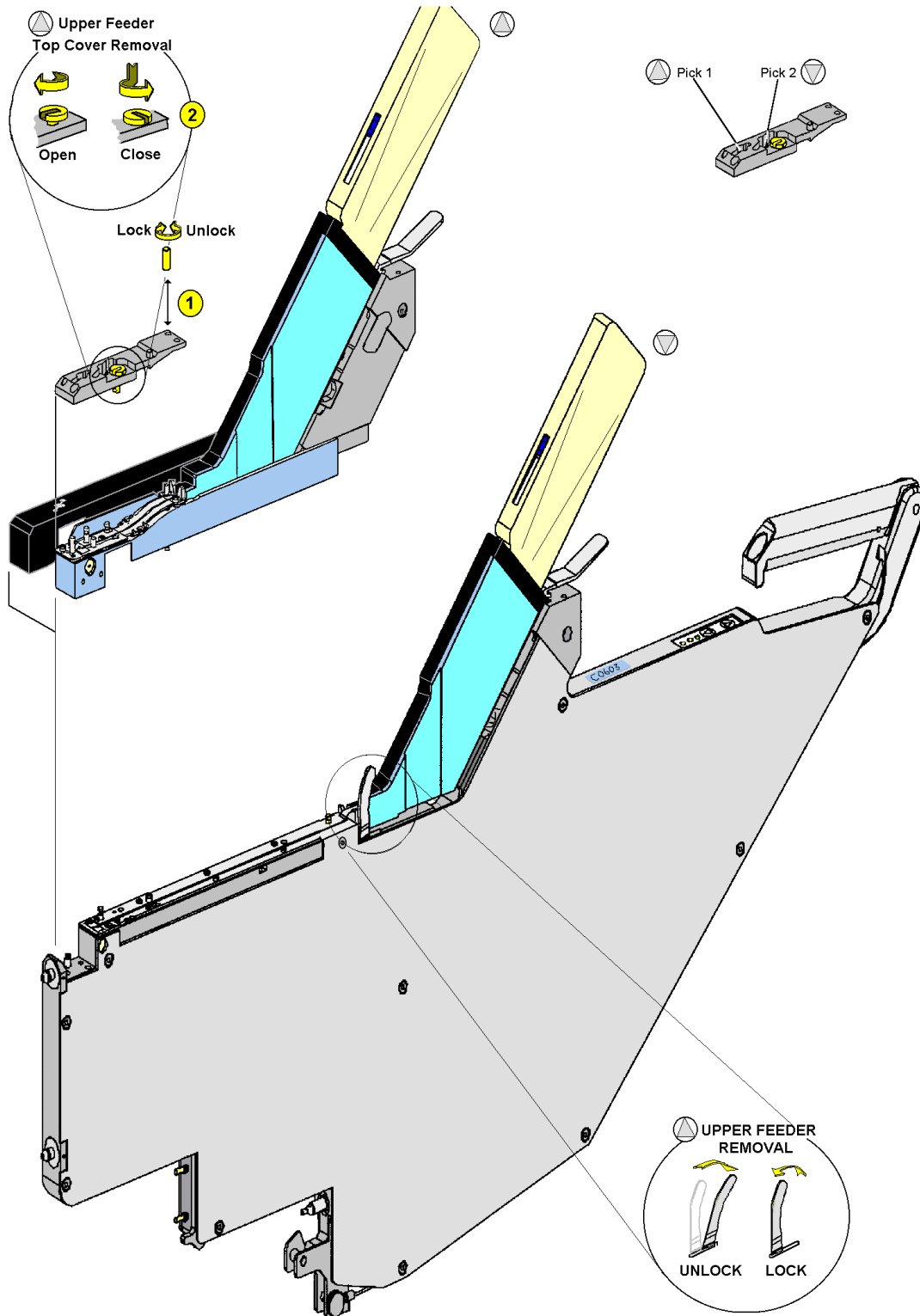


TABLE 5.2.1.5a

Removing the cover (access: pick 1) or upper feeder (access: pick 2).



---

## Trouble Shooting

---

- Flip the feeder upside down and let **all** components fall out of the transport area of the upper (figure 5.2.1.5b) or lower (figure 5.2.1.5c) feeder.



**NOTE:** Since the components are so small that the ‘suspected’ component cannot be seen easily by the eye, it is better to just remove all components. This way it is also sure that no component will be jammed (or crushed) between the cover and the transport area during assembly of the cover.

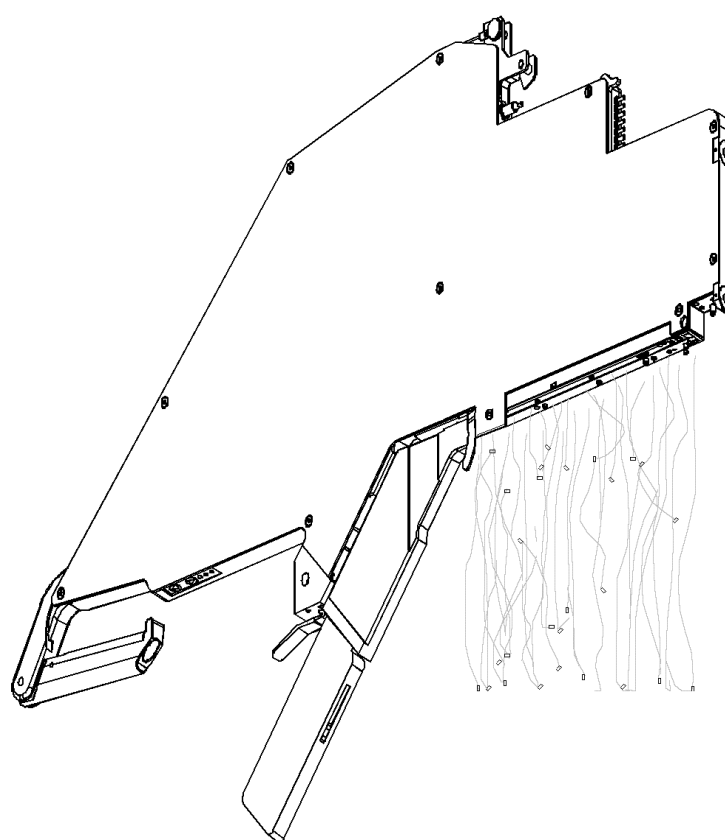


TABLE 5.2.1.5b

Remove all components from the transport area (shown: Lower feeder).

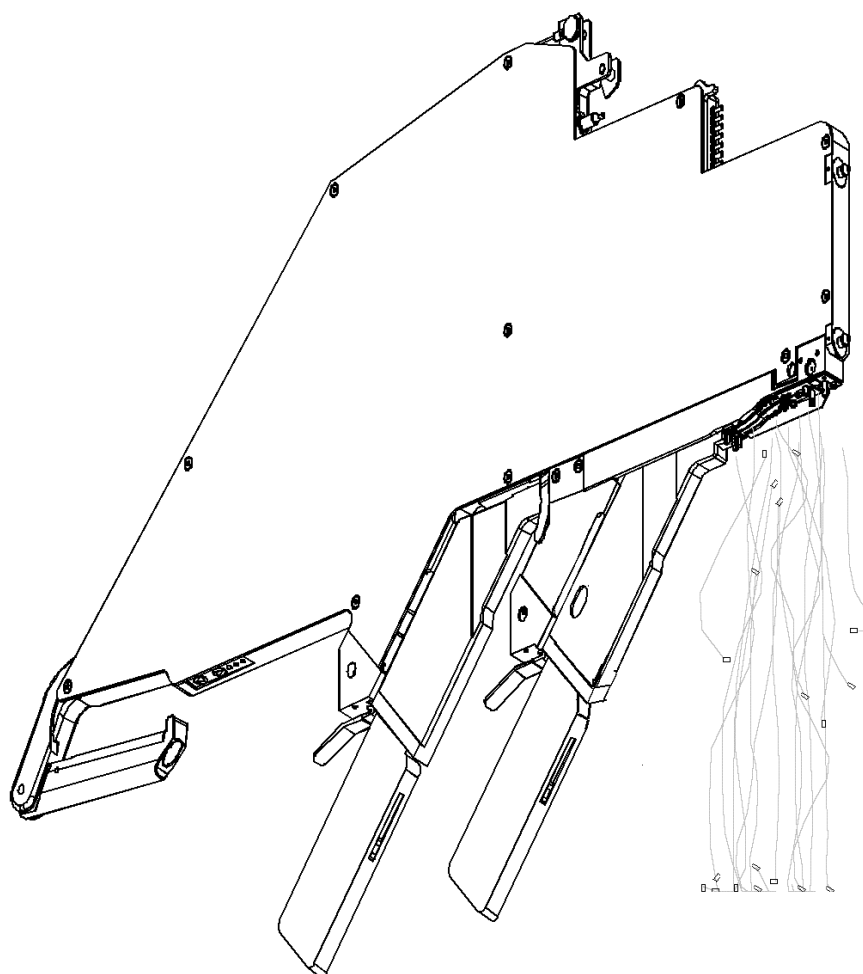


TABLE 5.2.1.5c

Remove all components from the transport area (shown: Upper feeder).

- Check if the transport area is really empty. If necessary, clean with a soft camel hair brush. Place the top cover (for upper feeder) or upper feeder (for lower feeder) back onto the twin bulk feeder. This is done as shown in figure 5.2.1.5a.

Check the bottom side of the top cover and the bottom side of the upper feeder for sticking components. Remove and clean if necessary.

- If a half component is stuck in the slider (pick position), remove carefully with a pair of tweezers.



**NOTE:** Figure 5.2.1.5d. shows the situations that should be prevented.

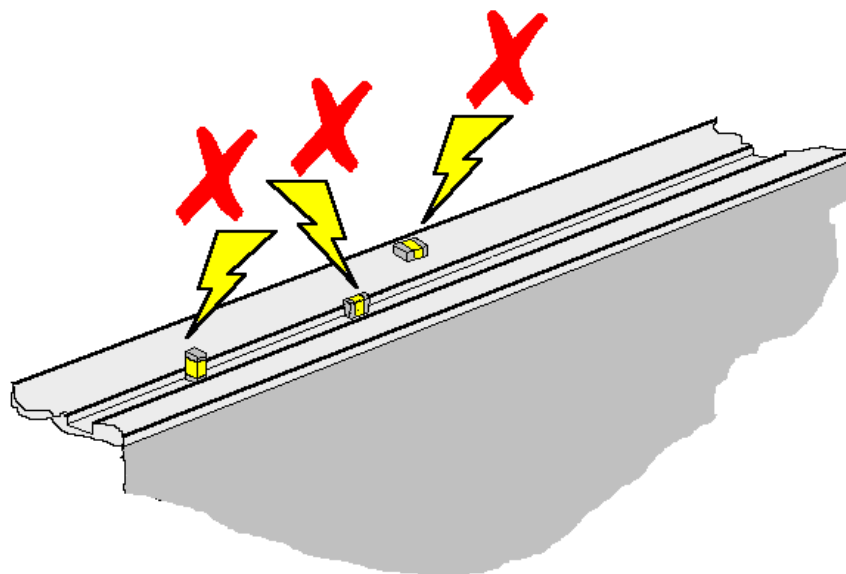


FIGURE 5.2.1.5d

Take care that no components remain behind tomb-stoned, on-edge or on the plate.

### 5.3 Using the best bulk feeder component.

As the Twin Bulk feeder tries to deal with all possible components, the performance (PPM levels) depends very much on the quality of the components. The variables that influence the performance are:

- Component dimensions and tolerances
- Component form and shape and smoothness
- Packaging and environment of components.

The following sections describes situations that can occur with components and the influence that it will have in a bulk feeding process. Not all situations are avoidable. However, the more of these factors are applicable to components, the worse a bulk process will become. The following sections can also be seen as a recommendation or guideline to manufacturers delivering bulk components.

## Trouble Shooting

### 5.3.1 Component dimensions and tolerances.

- The component length, width and height dimensions and tolerances should be within the range specified in table 5.3.1. Only these components can be fed by the bulk cassette and can pass through the transport area.

		Length			Width			Thickness		
		min	nom	max	min	nom	max	min	nom	max
PA2648/00	C0201 (0603C)	0.57	0.60	0.63	0.27	0.30	0.33	0.27	0.30	0.33
PA2648/35	C0805-125 (2012-125)	1.90	2.00	2.10	1.15	1.25	1.35	1.15	1.25	1.35
PA2648/45	MELF 0805	1.90	2.00	2.10	Ø 1.15		Ø 1.25		Ø 1.35	
PA2648/50	C0402 (1005C)	0.95	1.00	1.05	0.45	0.50	0.55	0.45	0.50	0.55
PA2648/60	R0402 (1005R)	0.95	1.00	1.05	0.45	0.50	0.55	0.30	0.35	0.40
PA2648/70	C0603 (1608C)	1.53	1.60	1.67	0.73	0.80	0.87	0.73	0.80	0.87
PA2648/80	R0603 (1608R)	1.55	1.625	1.70	0.70	0.80	0.90	0.35	0.45	0.55
PA2648/85	MELF 0604	1.50	1.60	1.70	Ø 0.90		Ø 1.00		Ø 1.10	
PA2648/90	C0805-06 (2012-06)	1.90	2.00	2.10	1.15	1.25	1.35	0.50	0.60	0.70
PA2648/95	R0805 (2012-06)	1.90	2.00	2.10	1.15	1.25	1.35	0.50	0.60	0.70

TABLE 5.3.1

Component Length, Width and Thickness.

- Within this range, the best component size is between the nominal size and the maximum tolerance. This is shaded Grey in table 5.3.1. Too much variation in sizing lead to skew of components in the transport area creating a clamping torque. An increased torque will eventually lead to components jamming itself in the transport area.

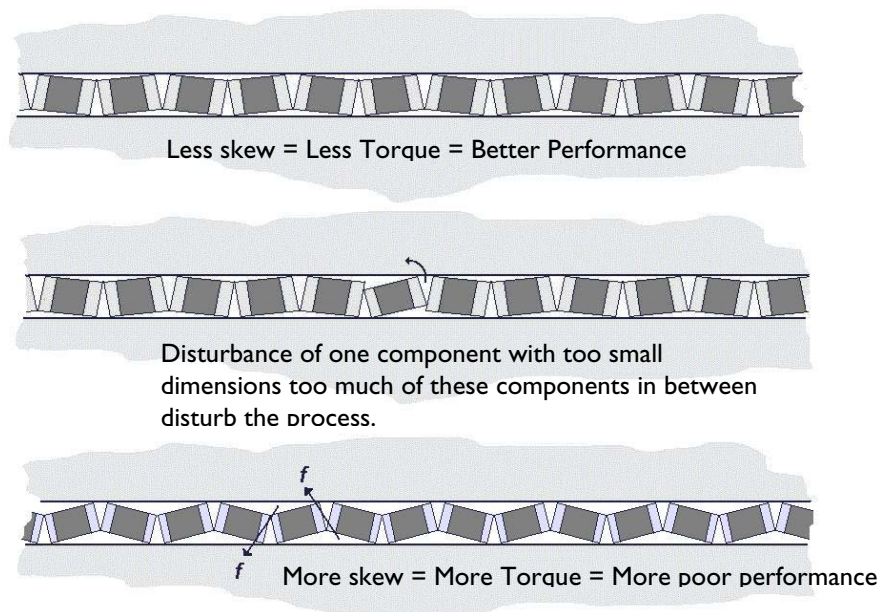


FIGURE 53.1a

Torque caused by component dimensions.

### 5.3.2 Component shape recommendations.

- The components should be square shaped. No Parallelogram shape or no cut-off edges. These shapes increase the skewing effect and therefore reduce the performance of the feeder.

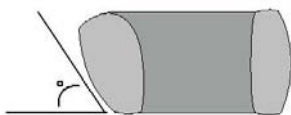


FIGURE 53.1b

Component Shape: Parallelogram / Not square.

---

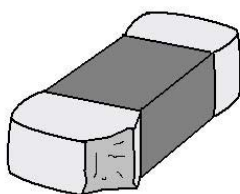


FIGURE 53.1c

Component Shape: Broken / Cut-Off Edges.

---

- Skewing of components is also avoided when components can push each other straightforward. In this case the head of a component should be flat. This is normally not the case and a radius is applicable. The best situation for components to be transported in a queue is when the radius of the component head is larger than or equals the width of the component itself.

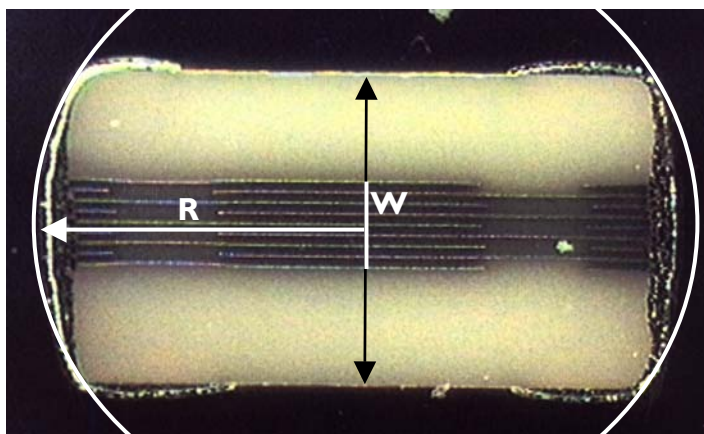


FIGURE 5.3.1d

**GOOD:** Radius  $\geq$  Width.

---

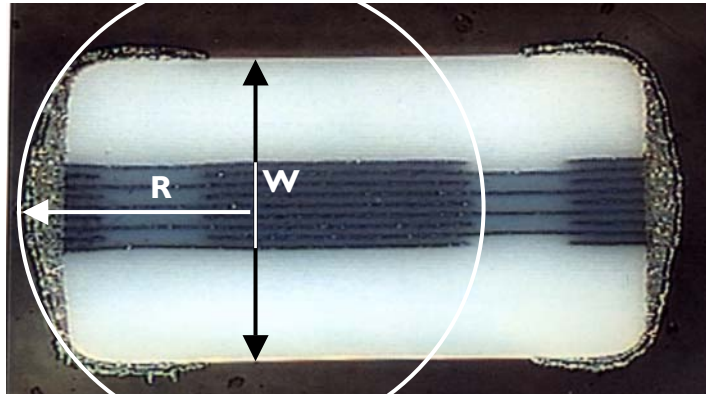


FIGURE 5.3.Ie

**LESS:** Radius < Width.

- With the same respect to the previous points, a smooth shaped solder head will help increase the performance of the component flow (and thus the performance of the bulk feeder).

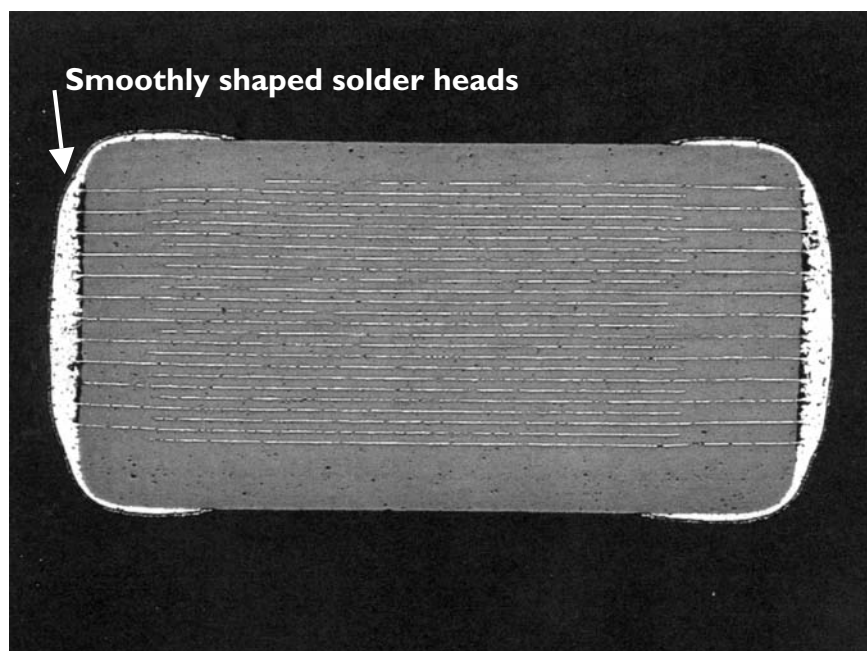


FIGURE 5.3.If

**GOOD:** Smooth round head.

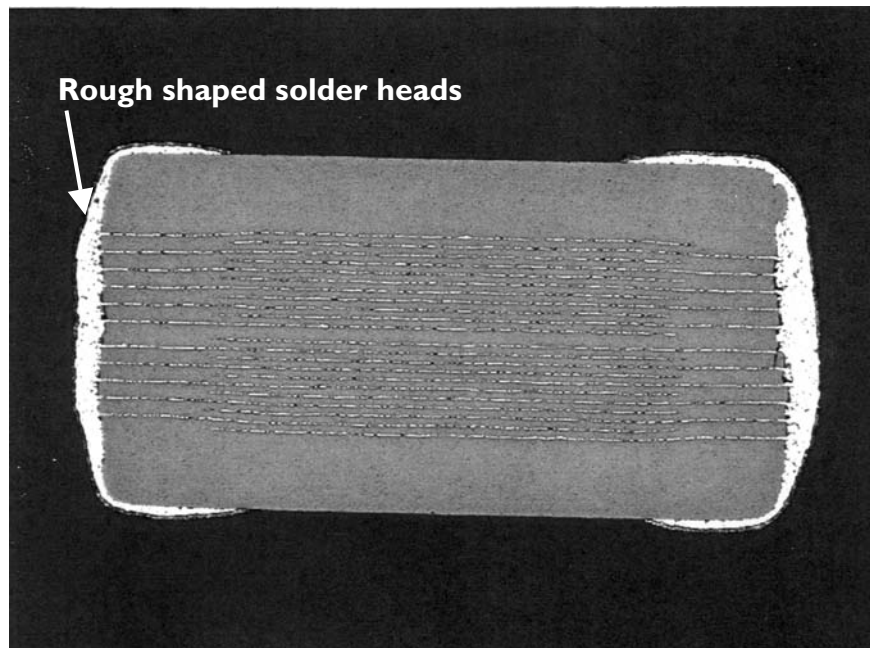


FIGURE 5.3.Ig

**LESS:** Not smooth, not round.

- When the components slide best through a transport area is when the surface of the solder head and body are as smooth as possible.

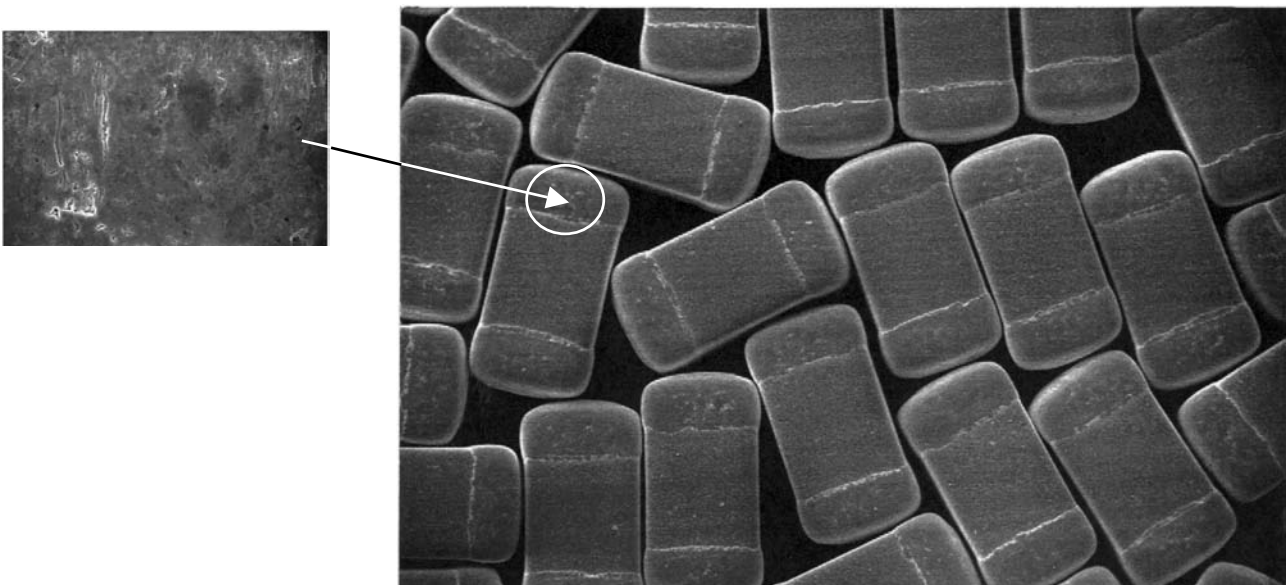


FIGURE 5.3.IH

**GOOD:** Smooth surface

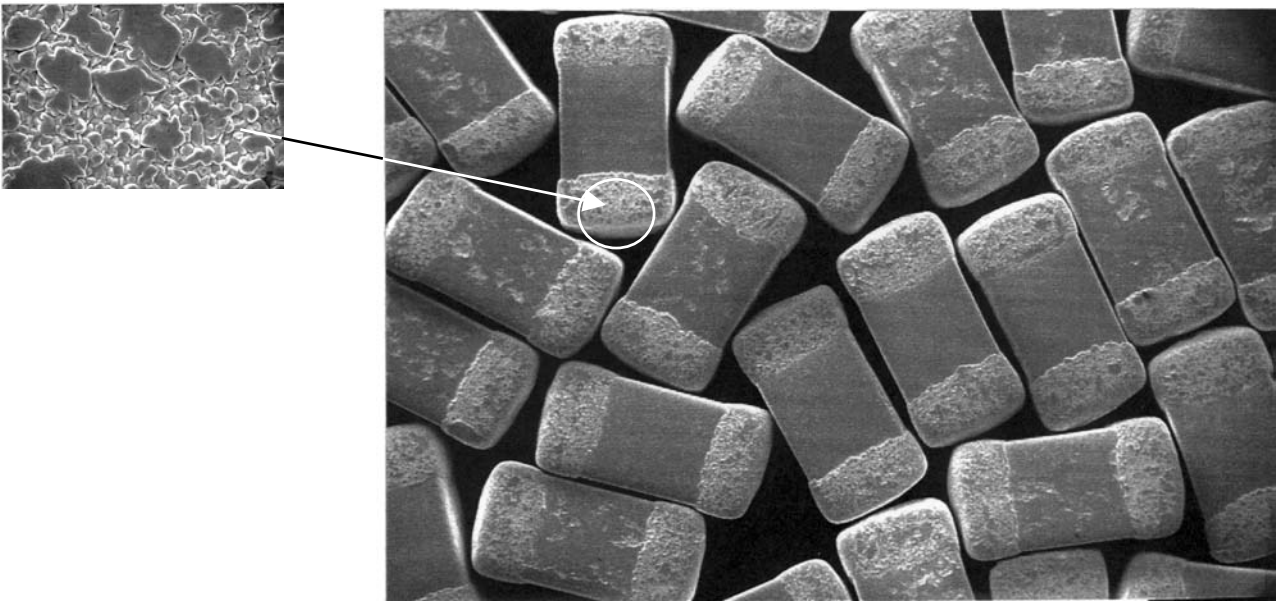


FIGURE 5.3.II

**LESS:** Rough surface

### Too much lead in tin heads:

For better solderability of the components, some vendors apply more lead in the solder heads of the component. This is not in the advantage of the bulk feeding process. Lead contaminates the lanes of the components very easily, decreasing the performance of the components drastically. It can even 'stop' the feeding process.

Isolating this problem can be done by cleaning the lanes of the feeder **and** the bulk cassette slightly with reagent grade alcohol. After cleaning the feeder must be fully dry (see maintenance chapter). If it runs well afterwards and the performance drastically decreases after a number of cassettes, this symptom is usually the case.

### Solution:

There is no solution for this problem. Many manufacturers decrease the amount of lead in the tin head due to environmental issues. Fortunately, more and more suppliers apply this process, enhancing therefore also the process of bulk feeding.



---

## Trouble Shooting

---

- In a transport area, there are various transition points when going from one area into another. Components with smooth transition edges from solder head to component body show less interference in the bulk process.



FIGURE 5.3.Ij

**GOOD:** Smooth Transition from tin head to body

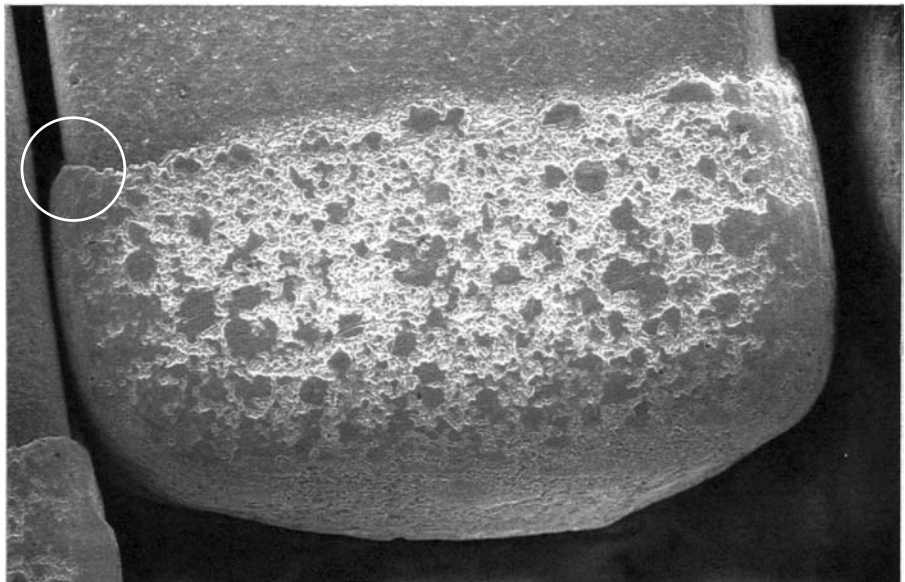


FIGURE 5.3.Ik

**LESS:** Edged transition from tin head to body

---

## Trouble Shooting

---

- When using resistors (thick or thin film) avoid the overcoating to be too small and high or round. Components are then not flat in the transport area and skewing occurs more frequent. Flat or larger lower overcoating is also more suitable for upside down mounting.

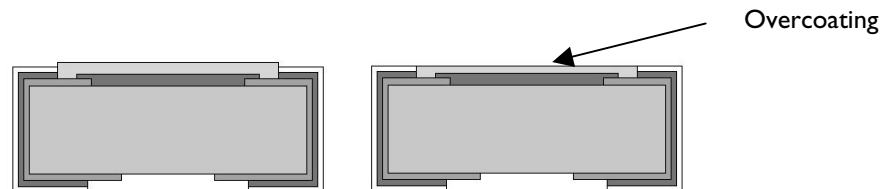


FIGURE 5.3.Im

**GOOD:** Overcoating larger, lower or equal to the tin height of the lead.

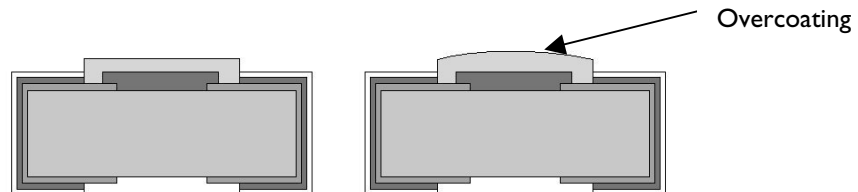


FIGURE 5.3.II

**LESS:** Overcoating too high and small or too round.



### WARNING

Resistors have a glass overcoating on the top side of the component. When this overcoating is too thick or too round this may result in 'tombstoning' of the components during the solder process in the oven, as illustrated with the picture below.



FIGURE 5.3.In

**LESS:** Tombstoning of components placed up side down.

### Packaging and environment of components.

The performance of bulk components decrease if one or more of the following situations is applicable:

- The location where components are stored are exposed to water or salt water
- The location where components are stored dew forms (temperature variations too high).
- The location where components are stored have a high concentration of toxic gas
- When shelf life exceeds more than 1 year (even if guaranteed shelf life is specified to be more than 1 year).
- The location where components are stored have high dust concentration
- The location where the components are stored are subject to strong vibration or shock.

**Intentionally left blank**

---

### CHAPTER 6 Replacement Instructions

---

#### 6.1 List of Tools

Table 6.1 gives recommended list of tools and materials for repairing and cleaning the Twin Bulk Feeders. All tools can be obtained locally.



**NOTE:** The used tools are only for those parts that can be replaced. Parts that cannot be replaced locally are not described in the replacement instructions.

Recommended tools and materials	
■ Brushes	<ul style="list-style-type: none"> <li>■ Small brushes (clean and anti-static)</li> <li>■ Camel Hair Brushes</li> </ul>
■ Cleaning Material	<ul style="list-style-type: none"> <li>■ Lint free Q-Tips</li> <li>■ Lint free tissue paper</li> <li>■ Reagent grade alcohol 95% (isopropanol). <b>Apply to local safety regulation.</b></li> <li>■ Dry Air blower (<b>no</b> moistened air).</li> </ul>
■ Screwdrivers:	<ul style="list-style-type: none"> <li>■ Torx No. 8, 9, 10, PB 400/6</li> <li>■ Phillips No. PB190</li> <li>■ Flat, Small sized and larger sized.</li> </ul>
■ Wrenches:	<ul style="list-style-type: none"> <li>■ Socket wrench 10mm</li> <li>■ Wrench 7mm</li> </ul>
■ Other tools:	<ul style="list-style-type: none"> <li>■ Hammer (small sized only)</li> <li>■ Dowel punch (head diameter ~ 1.5mm round).</li> <li>■ Pair of tweezers</li> </ul>
■ Soldering tools	<ul style="list-style-type: none"> <li>■ Soldering Iron</li> <li>■ Soldering Tin</li> </ul>
■ Special help tools	<ul style="list-style-type: none"> <li>■ Nylon Cord, Fisherman's cord or similar cord type (thin ~1.5mm diameter)</li> </ul>

TABLE 6.1

List of Tools

---

---

## Replacement Instructions

---



### CAUTION

Air supply in a local workshop must comply to the same requirements as with the FCM. Wet and Moistened air will decrease the twin bulk feeder performance drastically.



### CAUTION

Do not grease or oil any part of the feeder. During production, grease or oil may end up in the transport area of the components and negatively influence the performance of the feeder and is hard to correct. This process can even happen after a couple of months.



### WARNING

Bulk feeding process is sensitive to any form of dust, dirt, grease, moist and oil. When replacing parts, work in a clean environment only.

### 6.2. Module 2 to 19

Module Overview (see Figure 6.2).

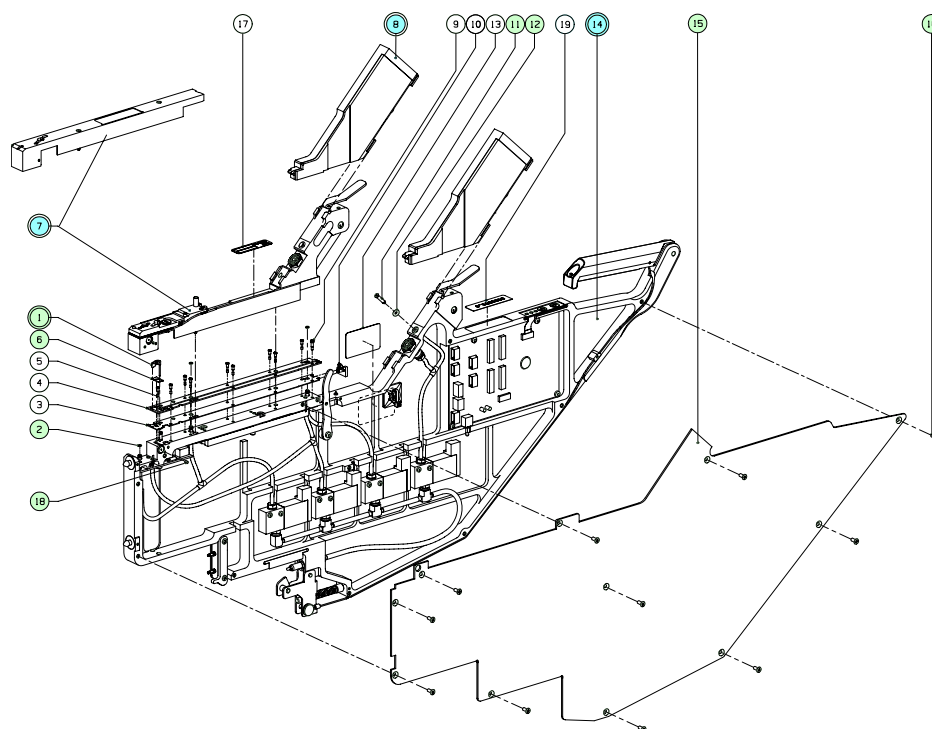


FIGURE 6.2.

Modules 2 to 19

Items for which local repair is possible are mentioned in table 6.2 All other parts cannot be replaced in local workshops.

Item	Description	Section
2	O-Ring 1,8 x 0,7	6.2.1
6	Slider	6.2.2
7	Upper Feeder Assembly	6.3
8	Bulk Cassette	6.4
11	Restriction + O-Ring	6.2.5
14	Base Block Assembly	6.5
15	Side Plate	6.2.7
1+18	Fork, Lower Feeder + Set Screw	6.2.8

TABLE 6.2.

Modules 2 to 19: Replacement parts

---

## Replacement Instructions

---

### 6.2.1 O-Ring

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 2
<b>Frequency</b>	■ Only when defective
<b>Tools</b>	■ Tweezers or pin for removing old O-Ring
<b>Precautions</b>	■ Avoid scratches, dust, dirt and dirty hands

#### Instructions:

When replacing the O-Rings on air nipples, take care of the following:

- Do not use grease or lubricants
- Work in clean environment

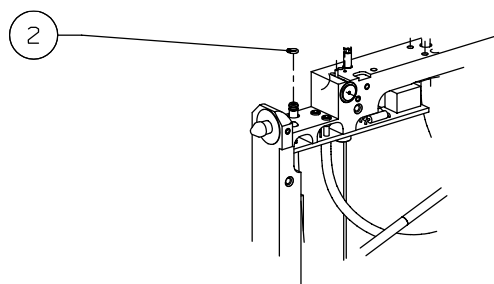


FIGURE 6.2I

O-Ring Replacement

### 6.2.2 Slider, Lower Feeder

<b>Item</b>	■ 6
<b>Frequency</b>	■ Only when defective
<b>Tools</b>	■ Tweezers
<b>Precautions</b>	■ Avoid scratches, dust, dirt and dirty hands

#### Instructions:

- Remove first the fork (item 1).
- Carefully remove the slider with the point of a pair of tweezers according the assembly in figure 6.2.3.
- Clean slider position and insert new slider carefully.



---

## Replacement Instructions

---

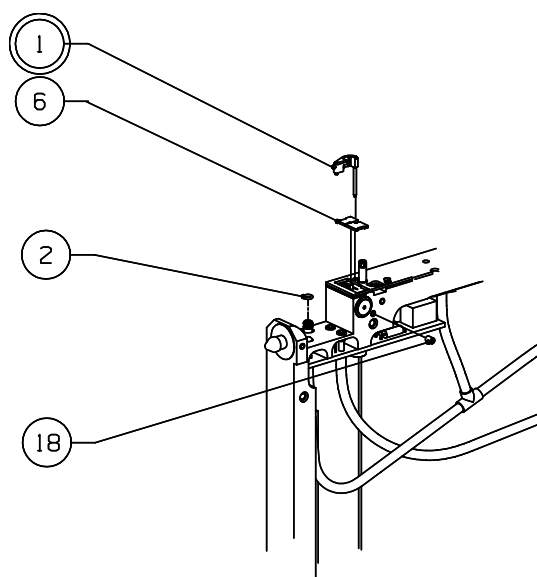


FIGURE 6.2.2

Slider Replacement

---

### 6.2.3 Upper Feeder assembly

[This section does not apply to Single Lane Bulk feeders]

For more information on replacement of items on this assembly, please refer to section 6.3.

### 6.2.4 Bulk Cassette Assembly

For more information on replacement of items on this assembly, please refer to section 6.5.

### 6.2.5 Hose Pillar Restriction + O-Ring, Lower Bulk Cassette

Item	■ 11, 12
Frequency	■ Only when defective
Tools	■ Screw driver, flat head (small)
Precautions	<ul style="list-style-type: none"><li>■ Do not grease</li><li>■ Avoid damages to O-Ring</li><li>■ Replace new restriction always with new O-Ring</li><li>■ Avoid damaging the hose (avoid leakage)</li><li>■ If hose is damaged, replace hose. Hose length is pre-defined. Replace with correct length when damaged. See section 6.6.16.</li></ul>

---

## Replacement Instructions

---

### Instructions:

- Disconnect the hose (45) on the inside of the feeder housing.
- The restriction (11) is screwed into the housing, remove by means of a flat-headed screwdriver.
- Remove the O-Ring (12) from the restriction and replace this by a new one.
- Assemble in reverse order.

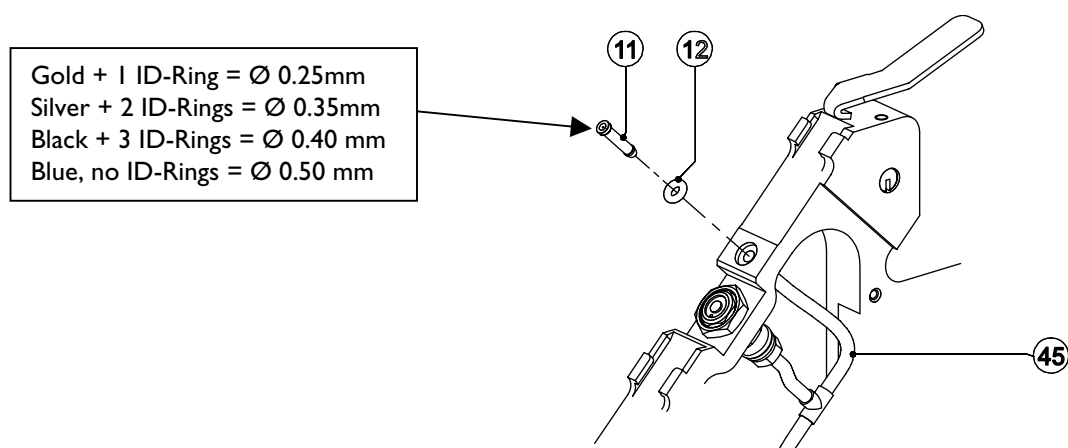


FIGURE 6.2.5

Replacement: O-Ring and Restriction

---

### 6.2.6 Base Block Assembly

For more information on replacement of items on this assembly, please refer to section 6.6

### 6.2.7 Side Plate

Item	■ 15, 16
Frequency	■ Only when damaged
Tools	■ Torx Screwdriver No 9
Precautions	■ None

### Instructions:

- Replace side plate according figure 6.2.7

---

## Replacement Instructions

---

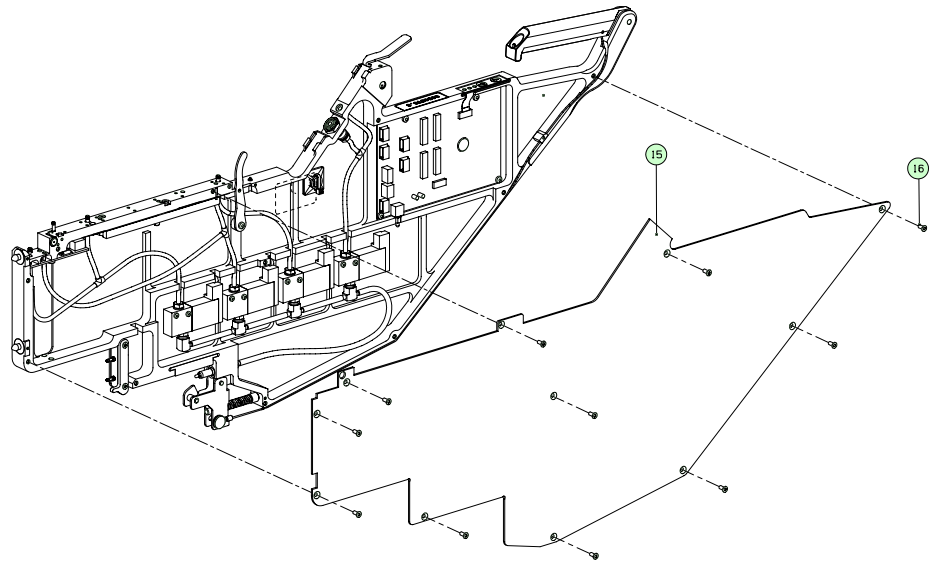


FIGURE 6.2.7

Replacement: Side Plate

### 6.2.8 Fork, lower feeder.

Item	■ I
Frequency	■ Only when damaged or lost
Tools	■ Allen key 1mm.
Precautions	■ Work in clean environment ■ Avoid grease, dirt and dust ■ Do not scratch surface of slider or any other component area.

#### Instructions:

- Remove the upper feeder assembly.
- Loosen set-screw and replace according figure 6.2.1.
- Set Screw Torque: **30 Ncm**

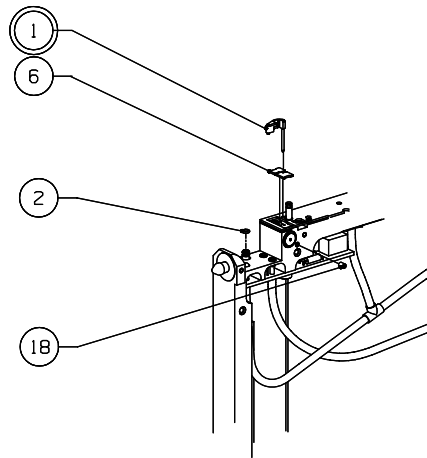


FIGURE 6.2.8

Replacement: Fork, lower feeder

---

### 6.3 Module 7: Upper Feeder assembly

[This section does not apply to Single Lane Bulk feeders]

Module Overview (see Figure 6.3).

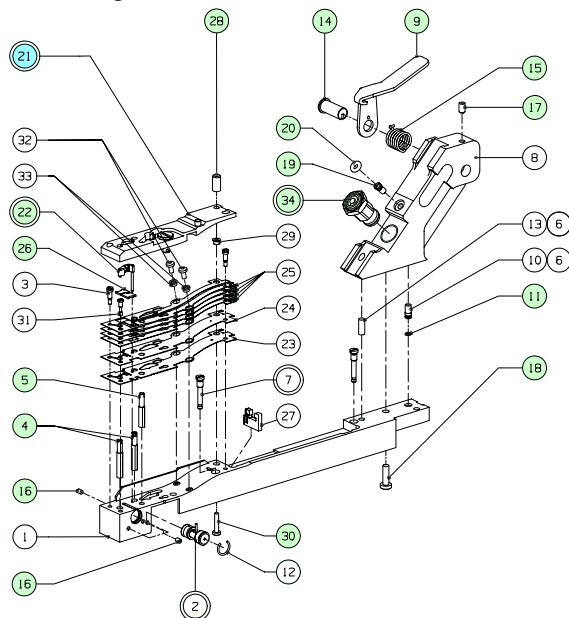


FIGURE 6.3

Module 7

---

Items for which local repair is possible are mentioned in table 6.3

## Replacement Instructions

Item	Description	Section
4	Sensors, Upper Feeder	6.3.2
5	Receiving Sensor, Lower Feeder	6.3.2.
9	Clamp Unit, Upper Bulk Cassette	6.3.3.
11	O-Ring	6.3.4
14	Bolt	6.3.3.
15	Spring, Clamp	6.3.3.
16	Set Screw, M2x3	6.3.2.
17	Set Screw, M3x5	6.3.3.
19	Hose Pillar / Restriction	6.3.5
20	O-Ring M2,57 x 1,78	6.3.5
21	Top Cover Assembly	6.3.6
22	Fork, Upper Feeder	6.3.7
26	Slider, Upper Feeder	6.3.8
28	Nut, Curled	6.3.6
34	Cylinder, Pusher	6.3.9

TABLE 6.3

Replacement: Items

All other parts cannot be replaced in local workshops.

### 6.3.1 Upper Feeder assembly

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ Whole assembly
<b>Frequency</b>	■ Only when damaged or when transport area is damaged.
<b>Tools</b>	■ None
<b>Precautions</b>	■ Remove all components from the transport area.

- Remove the bulk cassette.
- Make sure there are no components located in or on the transport area of the lower feeder.
- Place the upper feeder assembly on the feeder as described in chapter 2.4.3.2 or as shown on the Quick Reference Card.

---

## Replacement Instructions

---

### 6.3.2 Upper Feeders sensors

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 4, 5, 16
<b>Frequency</b>	■ Only when defective
<b>Tools</b>	■ Allen key :
<b>Precautions</b>	■ Clean lenses with brush after replacement.

#### Instructions:

- Remove the relevant set screw (16) from the holder
- Pull the sensor from the top of the holder in order to remove.
- Place the new sensors in the block to their furthest downward position. The sensor is secured with set-screw (16) against the flat side of the sensor housing. The sensors must face the correct direction.
- Tightening force: 30 Ncm.

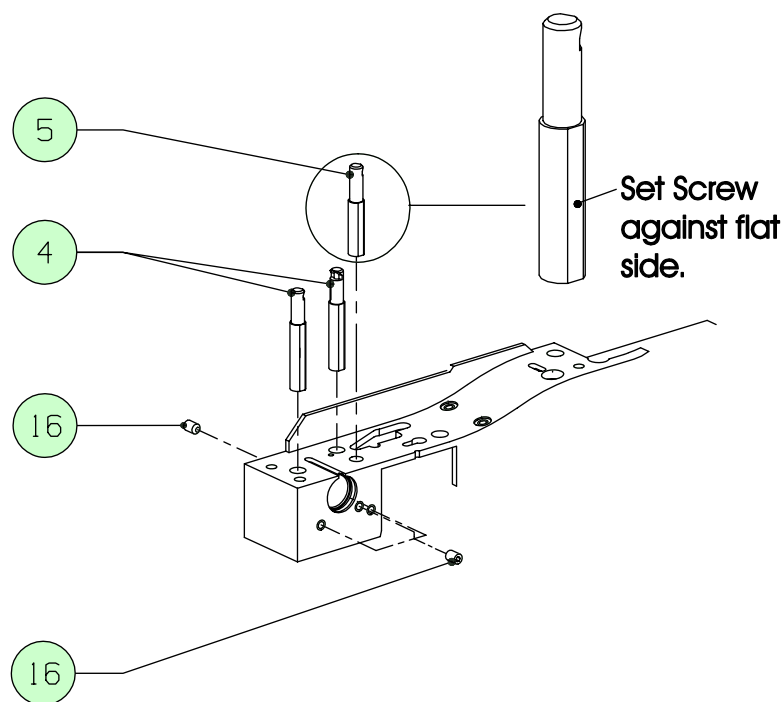


FIGURE 6.3.2

Sensors replacement.

---

## Replacement Instructions

---

### 6.3.3 Bulk Cassette clamping mechanism

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 9, 14, 15, 17
<b>Frequency</b>	■ Only when defective
<b>Tools</b>	■ Allen Key 1.5mm ■ Flat Screw Driver (small)
<b>Precautions</b>	■ None.

The description below removes all parts. Replace only the relevant defective part.

#### Instructions:

- Loosen set screw (17)
- Remove the bolt (14) from the holder housing (8).
- Detach spring (15) from the clamp (9).
- Replace any of the defective parts.
- Assembling is done in reverse order. Bolt (14) has a flat surface. Before inserting the bolt, check out where the flat side is located in relation to the set-screw. When setting the pre-tension, turn the bolt (counter)clock-wise (do not press, only turn the bolt) as far as when the flat side of the bolt is facing the set-screw.
- Tighten the set screw with 60 Ncm.

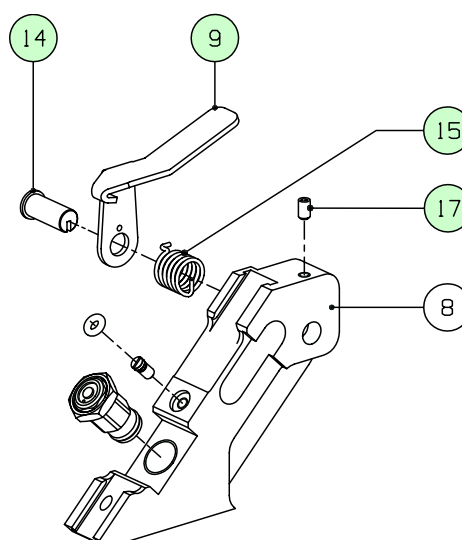


FIGURE 6.3.3

Bulk Cassette Clamp replacement.

---

## Replacement Instructions

---

### 6.3.4 O-ring, Nipple

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 11
<b>Frequency</b>	■ Only when defective
<b>Tools</b>	■ None
<b>Precautions</b>	■ Do not grease O-Ring

#### Instructions:

- Replace as shown in figure 6.3.4

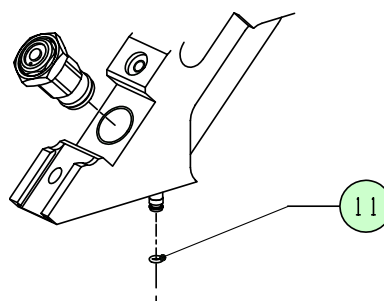


FIGURE 6.3.4

O-Ring (holder) replacement.

---

### 6.3.5. Restriction + O-Ring

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 19, 20
<b>Frequency</b>	■ When dirty, damaged or lost.
<b>Tools</b>	■ Flat Screwdriver.
<b>Precautions</b>	■ Do not grease O-Ring, operate in clean environment.

#### Instructions:

- The restriction is screwed in the feeder housing. Remove the restriction + O-ring by using a flat screwdriver.
- If the restriction is replaced, it is recommended to add a new O-Ring to the new restriction. Add the O-Ring **before** inserting the new hose pillar in the bulk feeder housing.



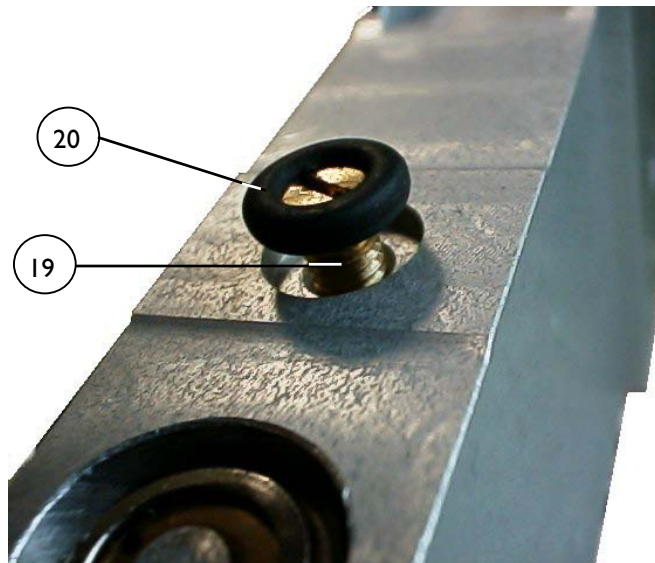


FIGURE 6.3.5

Replacement: Restriction + O-Ring.

---

### 6.3.6 Top Cover

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 21, 28
<b>Frequency</b>	■ When damaged or lost.
<b>Tools</b>	■ None
<b>Precautions</b>	■ Operate in clean environment. ■ Remove all components from the component path



**NOTE:** Replacement of top cover parts can be found on the quick reference card or in section 2.4.3.2 (figure 2.4.3.2d).

#### Instructions:

- Remove curled nut 28
- Turn knob into unlock position and remove the cover
- Add new cover in reversed order.

---

## Replacement Instructions

---

### 6.3.7 Fork, Upper Feeder

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 22
<b>Frequency</b>	■ When damaged or lost.
<b>Tools</b>	■ Allen Key 1mm
<b>Precautions</b>	■ Operate in clean environment. ■ Remove all components from the component path

#### Instructions:

- Remove Fork (22) by loosening set-screw 16.
- Insert new Fork and secure by tightening set screw 16 with a torque of 30 Ncm.

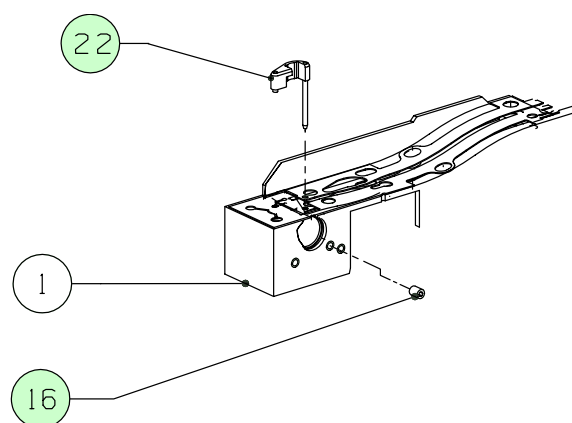


FIGURE 6.3.7

Replacement: Fork, Upper Feeder.

---

### 6.3.8 Slider, Upper Feeder

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 26
<b>Frequency</b>	■ When damaged or lost.
<b>Tools</b>	■ Pair of tweezers, soft camel hair brush
<b>Precautions</b>	■ Avoid scratches ■ Operate in clean environment. Clean lanes with camel hair brush when dirty. ■ Remove all components from the component path

---

## Replacement Instructions

---

### Instructions:

- Remove the slider from the pick position carefully with a pair of tweezers. Take care that the pin from the air cylinder does not come loose.

### 6.3.9 Cylinder, pusher

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 34
<b>Frequency</b>	■ When defective.
<b>Tools</b>	■ Socket wrench
<b>Precautions</b>	■ Operate in clean environment ■ Do not use grease or oil

### Instructions:

- Remove cylinder by the wrench by turning the cylinder anti-clockwise.
- Insert cylinder in reverse order.

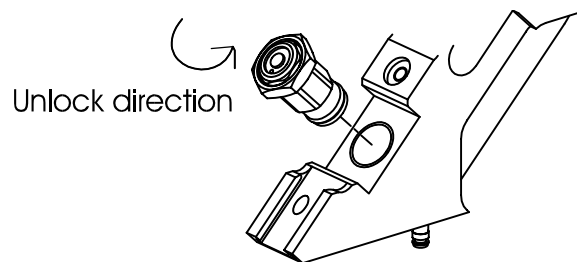


FIGURE 6.3.9

Replacement; Cylinder Pusher

---

## Replacement Instructions

---

### 6.4 Module 7-21: Top Cover Assembly

[This section does not apply to Single Lane Bulk feeders]

Module Overview (see Figure 6.4).

Item	Description	Section
1	X-Pin (this pin has no function on the FCM-II)	6.4.1
2	Cover	6.4.1
3	Lock	6.4.1
4	Dowel	6.4.1
5	Spring, compression	6.4.1

It is always recommended to exchange the complete top cover assembly, rather than exchanging separate items. This to avoid damage on the bottom side of the cover. Damage leads to non-smooth movement of components in the transport area.

#### 6.4.1 All items

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 1, 2, 3, 4, 5
<b>Frequency</b>	■ When defective.
<b>Tools</b>	■ Dowel bench press.
<b>Precautions</b>	■ Operate in clean environment ■ Do not use grease or oil ■ Do not use glue ■ Do not damage bottom side of cover.

#### Instructions:

- Remove/Insert all items as shown in figure .6.4.1. When inserting Pin (4) to the locking nut, make sure the pin is inserted, and sticking out, in the right direction (see insert).

---

## Replacement Instructions

---

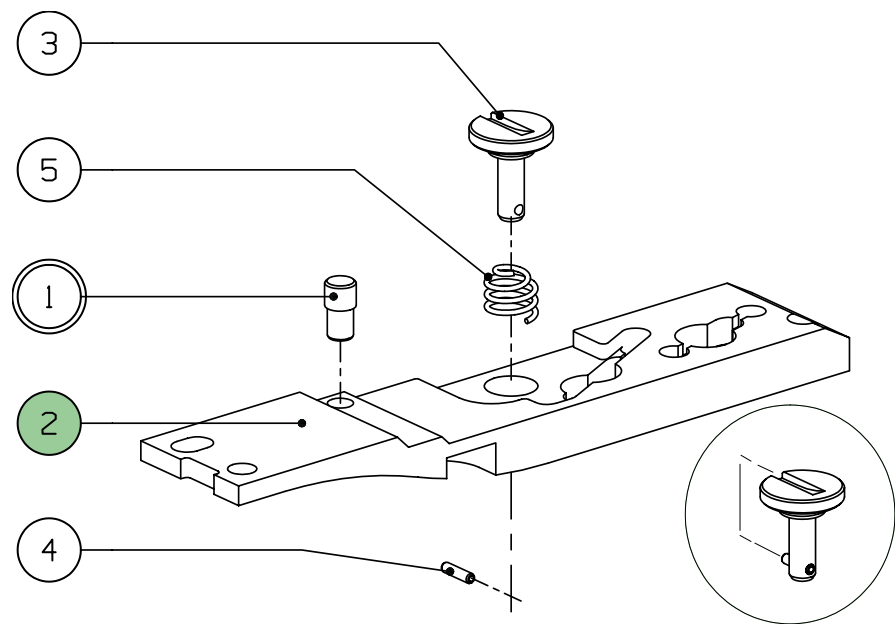


FIGURE 6.4.I

Replacement; Top Cover Parts

---

### 6.5 Module 8: Bulk Cassette

Module Overview (see Figure 6.5).

Items for which local repair is possible are mentioned in table 6.5

Item	Description	Section
8-2	Cover	6.5.1
8-3	Component Stopper (not in C020I cassette)	6.5.2
8-4	Gate Support Plate	6.5.2
8-5	Bulk Case Holder	6.5.2
8-9	Moveable Block	6.5.2
8-10	Moveable Gate	6.5.2

All other parts cannot be replaced in local workshops.

## Replacement Instructions

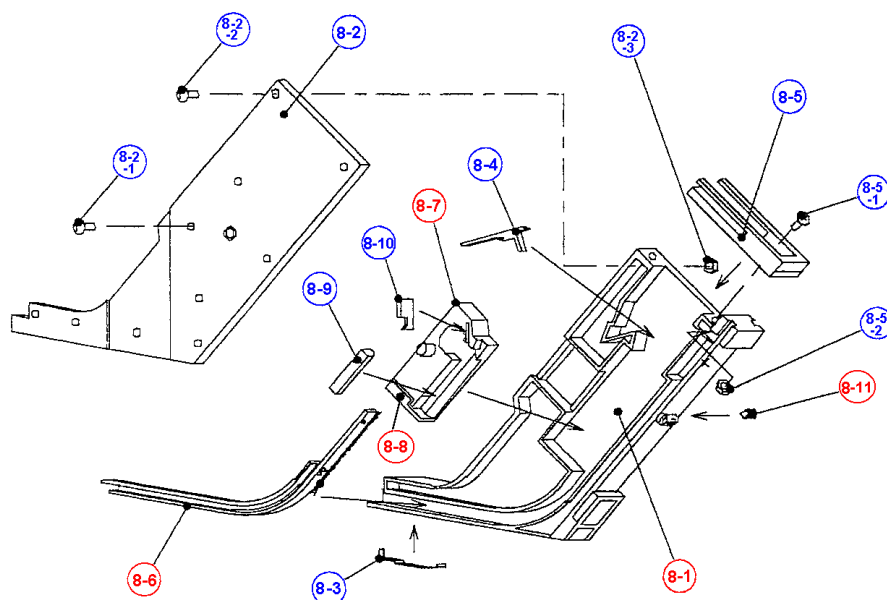


FIGURE 6.5.

Bulk Cassette Parts



**NOTE:** Pin 8-11 is pre-set by the manufacturer. Do not change the setting of this item. It will **negatively influence** the performance of the bulk cassette.

### 6.5.1 Cover

<b>Item</b>	■ 8-2
<b>Frequency</b>	■ 2.5 million index operations
<b>Tools</b>	<ul style="list-style-type: none"> <li>■ Phillips screwdriver</li> <li>■ Dry air gun.</li> </ul>
<b>Precautions</b>	<ul style="list-style-type: none"> <li>■ Operate in clean environment (all dirt, dust or any material particle will disturb the bulk feeding process).</li> <li>■ Do not use grease or oil</li> <li>■ Do not use glue.</li> <li>■ When blow-drying parts. Use dry, non-moistened, air <b>only</b>.</li> </ul>

---

## Replacement Instructions

---

### Instructions:

- Cover the hex nuts at the rear side of the bulk cassette by means of tape (to avoid losing them). Normally the nuts should not fall out, but this action is preventive only.
- Place the bulk cassette flat onto a table with the cover facing upward.
- Remove the screws from the cover (10 screws in total of two different lengths). Store in safe place so they will not be lost.

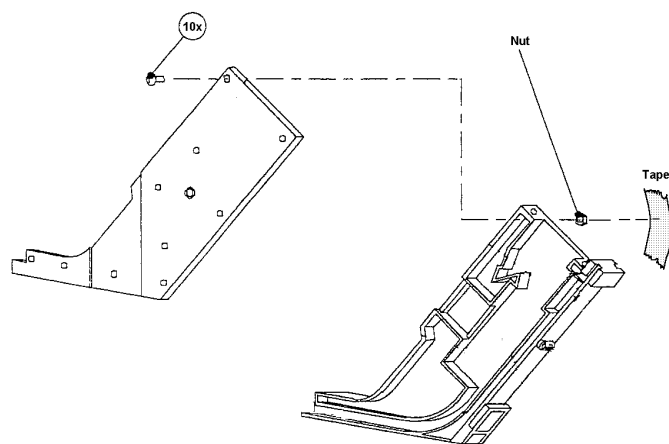


FIGURE 6.5.1a

Bulk Cassette Cover replacement

- Clean the inside of the cover with a soft, lint free, alcohol swab. Do **not** use thinner or an alcohol bath (swab only).
- Dry the cover by using an air gun (or similar device).

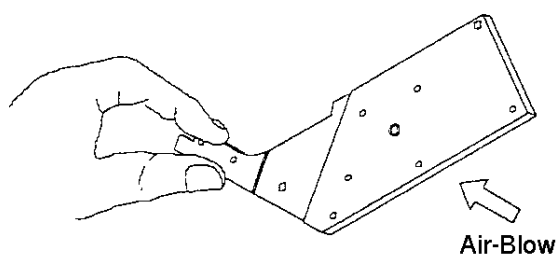


FIGURE 6.5.1b

Drying bulk cassette covers.

- Check for damages on the cover, especially opposite to the chamber area and chute area. If heavily damaged, replace the top cover by a new top cover. Damaged top cover may influence the performance of the bulk feeder negatively.

---

## Replacement Instructions

---

### Assembling:

1. Place the main body flat onto a table.
2. Secure (loosely) the cover by means of the screws
3. Secure the screw if the cover is positioned at the following requirements:
  - Clearance between bottom of cassette and bottom of cover is less than +0.1mm. The cover may not stick out from the bottom of the cassette.
  - Clearance from the cover and the chute end should be less than +0.05mm. The cover may not stick out at the front of the cassette.

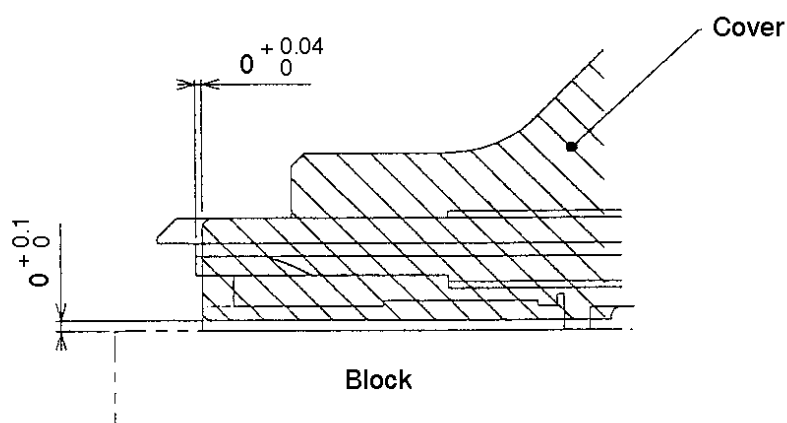


FIGURE 6.5.1c

assembling the cover.

---



### **TIP:** Practical implementation:

- Add the top cover to the bulk cassette, but do not tighten screws.
- Place the bulk cassette correctly onto the bulk feeder, make sure it is placed correctly.
- Shift the cover as far as possible to the front of the feeder and downward. While holding it into this position, tighten the screws.

When placing the bulk cassette back onto the feeder: Make sure there are no components located in or on the transport area of the lower feeder.



---

## Replacement Instructions

---

### 6.5.2 Bulk Cassette Parts

Item	■ 8-3, 8-4, 8-5, 8-9, 8-10
Frequency	■ When defective or lost
Tools	■ None
Precautions	<ul style="list-style-type: none"><li>■ Operate in clean environment (all dirt, dust or any material particle will disturb the bulk feeding process).</li><li>■ Do not use grease or oil</li><li>■ Do not use glue.</li><li>■ Dry Air Gun. Use dry air <b>only</b>.</li></ul>

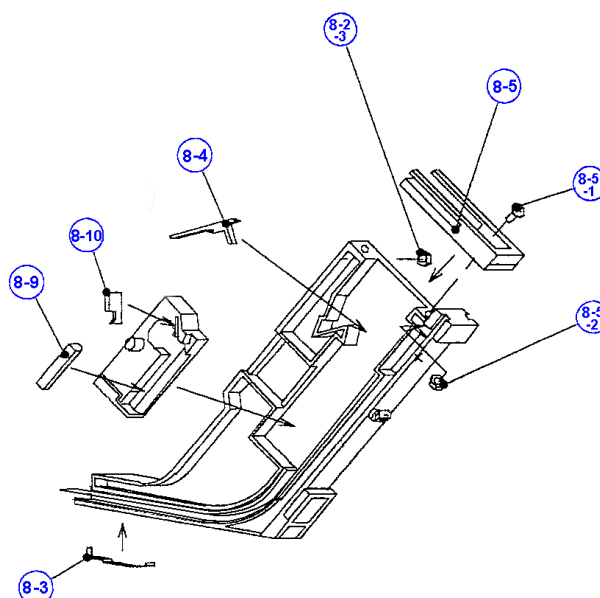


FIGURE 6.5.2a

Replacement: Bulk Cassette Parts



### CAUTION

After cleaning any part of the bulk cassette (as described in the following sections), it must be made sure the parts are 100% dry. Make sure no moist is caught between hands and parts during drying. Moist will degrade the performance of the bulkfeeder drastically. **USE DRY AIR ONLY.**

---

## Replacement Instructions

---

### Instructions:

- When cover is opened, any of the mentioned parts can be replaced by hand. The holder interface (8-5) is attached to the main body by means of two screws (8-5-1) and two nuts (8-5-2).

### Cleaning:

Cleaning the parts in the cassette may be required when dirt has entered the bulk cassette causing poor bulk feeding performance. In this case follow the instructions below:

Reagent grade isopropanol or thinner can clean all metal parts. Do not dry by means of a cloth or other material that can leave particles behind. Use an dry air blower to let the part dry.



**NOTE:** When lubricating or cleaning with isopropanol or thinner, make sure to wear gloves to avoid skin contact.



### **WARNING**

**ISOPROPANOL IS POISONOUS AND HIGHLY FLAMMABLE. OBSERVE THE MANUFACTURERS SAFETY PRECAUTIONS WHEN USING ISOPROPANOL.**

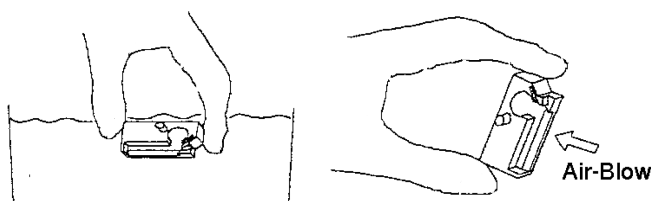


FIGURE 6.5.2b

Cleaning the chamber.

On the left side of the chamber block an extra piece is screwed, make sure there is no moist in-between, this will end up in the component area. Remove before blowing dry the unit, then attach this part back to the chamber.

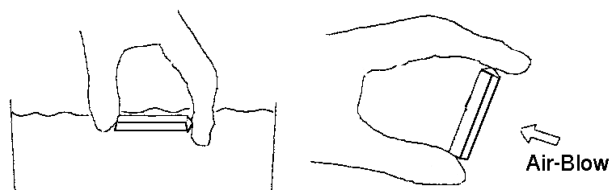


FIGURE 6.5.2c

Cleaning the moveable block.

---

## Replacement Instructions

---



FIGURE 6.5.2d

Cleaning the moveable gate.

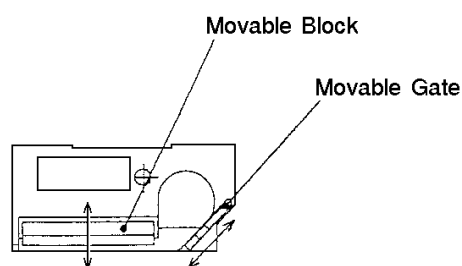


FIGURE 6.5.2e

Checking the moveable parts.

After placing back the moveable block and gate into the chamber block, check if the parts move freely and that there is no dirt in-between.

When replacing the component stopper pin, make sure that, when pressing the specified point (F: as shown below), the pin in front clears the component transport area at the front of the bulk cassette. This is also valid vice versa. When releasing point 'F', the stopper should end up in the transport area of the chute in order to prevent components falling out.

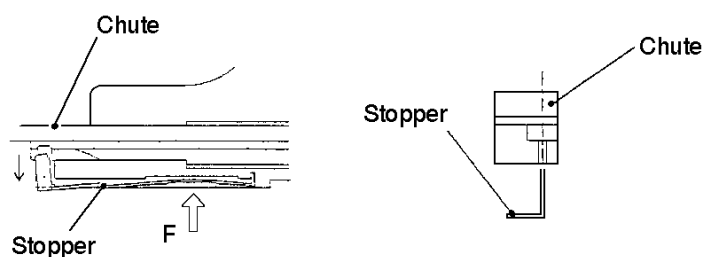


FIGURE 6.5.2d

Replacement: Component stopper pin

### 6.6 Module 14: Base Block Assembly

Module Overview (see Figure 6.6).

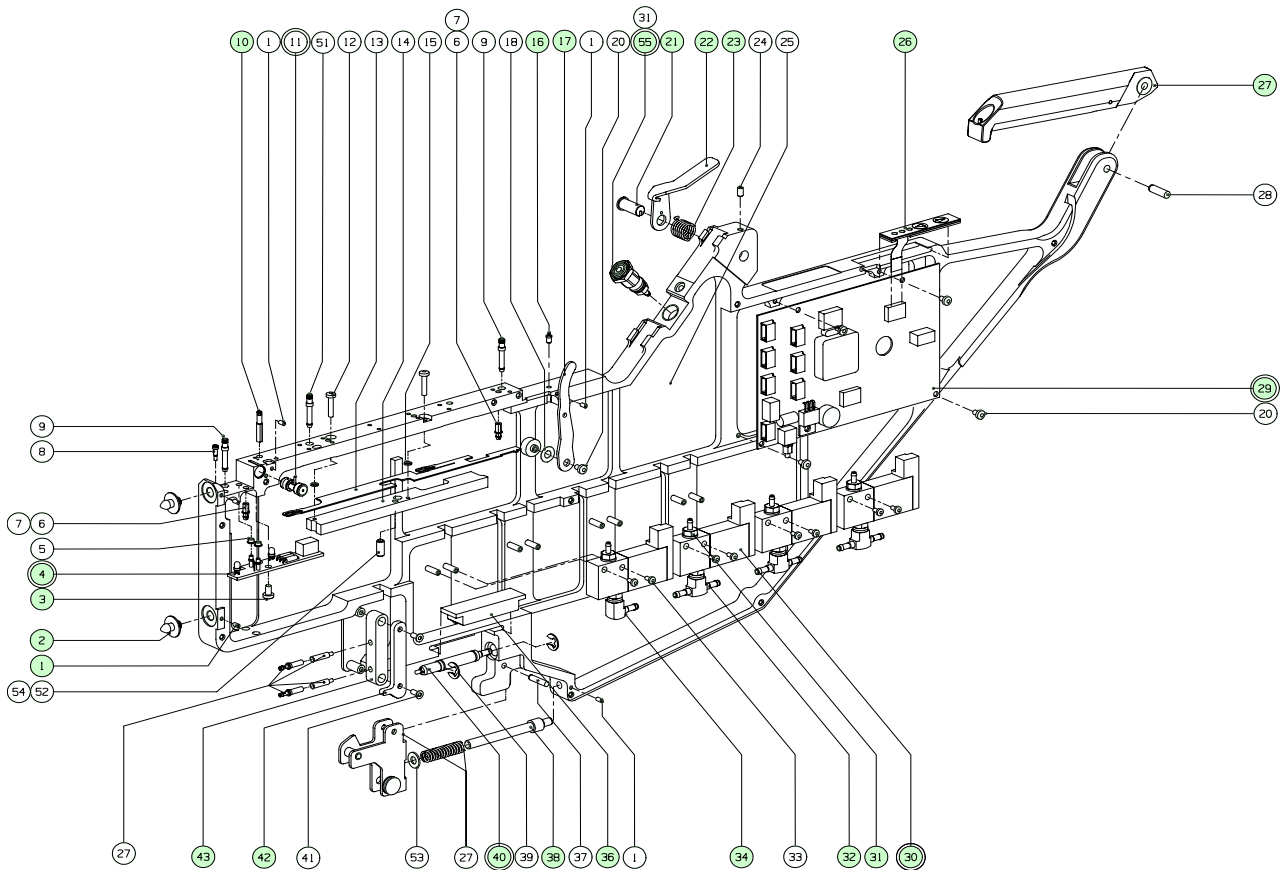


FIGURE 6.6

Base Block Assembly items

Items for which local repair is possible are mentioned in table 6.6

## Replacement Instructions

Item	Description	Section
2	Pin Feeder Positioning	6.6.1
4	Sensor Print Assembly	6.6.2
9	Nipple	6.6.3
10	Sensor	6.6.4.
16	Component Stopper Pin	6.6.5
17	Locking Lever	6.6.6
21	Bolt, Clamp	6.6.7
22	Clamp	6.6.7
23	Spring, Clamp	6.6.7
26	Human Interface	6.6.8
27	Interface Set (includes: Handle, contact pins, clamp, cable)	6.6.9
29	Feeder Controller	6.6.10
30	Valve MAC 34B-ABA-GDKA-IBA	6.6.11
31	Hose Pillar CN-M5-PK-3	6.6.11
32	T-Hose Nipple M5	6.6.11
34	L-Nipple LCN-M5-PK-3	6.6.11
36	Guide Block	6.6.12
38	Spring Shaft	6.6.9.2
40	Pneumatic Pen	6.6.13
42	Guide Block	6.6.14
43	Contact Block	6.6.14
55	Pusher Cylinder, Lower Bulk Cassette.	6.6.15

TABLE 6.6 Replacement Parts.

All other parts cannot be replaced in local workshops.

### 6.6.1 Positioning Pins

<b>Item</b>	■ 1, 2
<b>Frequency</b>	■ When damaged or lost
<b>Tools</b>	■ Allen key 1mm
<b>Precautions</b>	■ None

#### Instructions:

- Loosen set-screw (1) and remove either of the two positioning pin.
- Add new pins and secure the set screw with a torque of 30 Ncm.

---

## Replacement Instructions

---

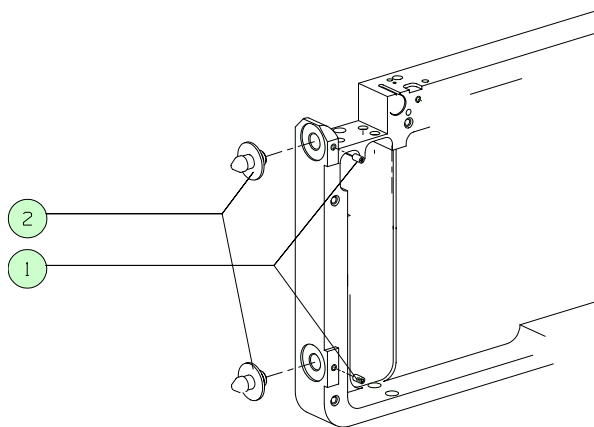


FIGURE 6.6.I

Replacement: Positioning Pins

---

### 6.6.2 Sensor Print

Item	■ 3, 4, 5
Frequency	■ When defective
Tools	■ Torx No. 9
Precautions	■ Operate in clean and ESD safe environment ■ Do not loose isolation bushes (5).

#### Instructions:

- Remove screws (3)
- Remove sensor print (4) by hand.
- Take care not to loose isolation bushes (5).
- Disconnect electrical cabling from the print.



**NOTE:** Operating without the isolation bushes may cause short circuit.

- Add new print and secure by screw (3). Tighten hand-tight.

---

## Replacement Instructions

---

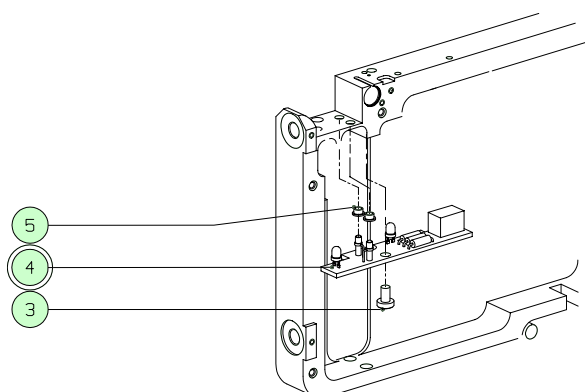


FIGURE 6.6.2

Replacement: Sensor Print

---

### 6.6.3 Air Nipple

[This section does not apply to Single Lane Bulk feeders]

<b>Item</b>	■ 9
<b>Frequency</b>	■ When defective
<b>Tools</b>	■ None
<b>Precautions</b>	<ul style="list-style-type: none"><li>■ Operate in clean environment</li><li>■ Do not use grease or oil.</li><li>■ Remove all components from the component transport area.</li><li>■ If hose is damaged, replace hose. Hose length is pre-defined. Replace with correct length when damaged. See section 6.6.16.</li></ul>

#### Instructions:

- Remove hose
- Remove Air Nipple from the top of the feeder.
- Add new Air nipple. Use new O-Ring when exchanging Air Nipple. Insert the Air Nipple until it hits the mechanical stop.
- Connect on the bottom side the hose up to the end so that the air nipple is kept in place. Do not insert too loose. Air nipple should not be able to move upward after placing the air hose correctly.

---

## Replacement Instructions

---

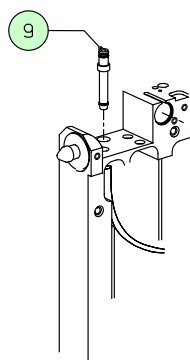


FIGURE 6.6.3

Replacement: Air Nipple

---

### 6.6.4 Sensor

Item	■ 10,1
Frequency	■ When defective
Tools	■ Allen key 1mm
Precautions	■ Operate in clean environment ■ Remove all components from the component transport area.

#### Instructions:

- Loosen set screw (1)
- Remove the sensor from the top of the feeder. Check out the direction the sensor is facing.
- Add new sensor in housing facing in the correct direction. Insert until the mechanical stop is reached.
- The sensor has a defined flat side where the set-screw is secured onto. Secure the set-screw with a torque of 30 Ncm. The sensor will automatically be set into the correct angle.

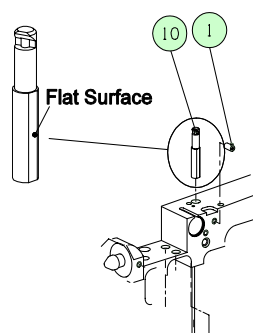


FIGURE 6.6.4

Replacement: Sensor

---



---

## Replacement Instructions

---

### 6.6.5 Component Stopper Pin

<b>Item</b>	■ 16, 1
<b>Frequency</b>	■ When damaged or lost
<b>Tools</b>	■ Allen Key 1mm
<b>Precautions</b>	■ None

#### Instructions:

- Remove and secure the component stopper pin by means of set-screw (1). The set-screw is secured with a torque of 30 Ncm.

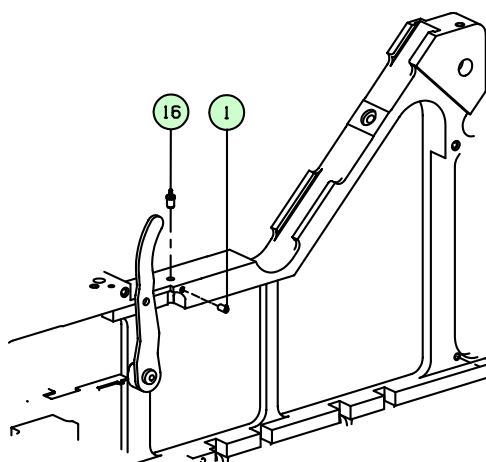


FIGURE 6.6.5

Replacement: Component Stopper Pin

---

### 6.6.6 Upper Feeder locking mechanism

[For Single Lane Bulk feeders, this unit locks the lower feeder cover.]

<b>Item</b>	■ 17, 18, 20
<b>Frequency</b>	■ When damaged or lost
<b>Tools</b>	■ Torx No. 9
<b>Precautions</b>	■ None

#### Instructions:

- Remove screw (20).
- Remove locking lever (17) and/or O-Ring (18) and replace these items by the new item.
- Assemble in reverse order. The screw (20) is secured with a torque of 30 Ncm.

---

## Replacement Instructions

---

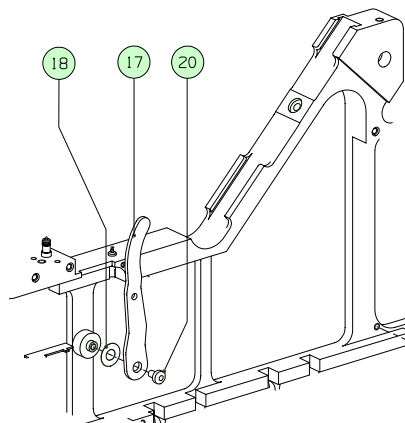


FIGURE 6.6.6.

Replacement: Locking Mechanism

---

### 6.6.7 Bulk Cassette clamping mechanism

<b>Item</b>	■ 21, 22, 23, 24
<b>Frequency</b>	■ Only when defective
<b>Tools</b>	■ Allen Key 1.5mm ■ Flat Screw Driver
<b>Precautions</b>	■ None.

The description below removes all parts. Replace only the relevant defective part.

#### Instructions:

- Loosen set screw (24)
- Remove the bolt (21) from the holder housing.
- Detach spring (23) from the clamp (22).
- Replace any of the defective parts.
- Assembling is done in reverse order. Bolt (21) has a flat surface. Before inserting the bolt, check out where the flat side is located in relation to the set-screw. When setting the pre-tension, turn the bolt (counter)clock-wise (do not press, only turn the bolt) as far as when the flat side of the bolt is facing the set-screw.
- Tighten the set screw with 60 Ncm.

---

## Replacement Instructions

---

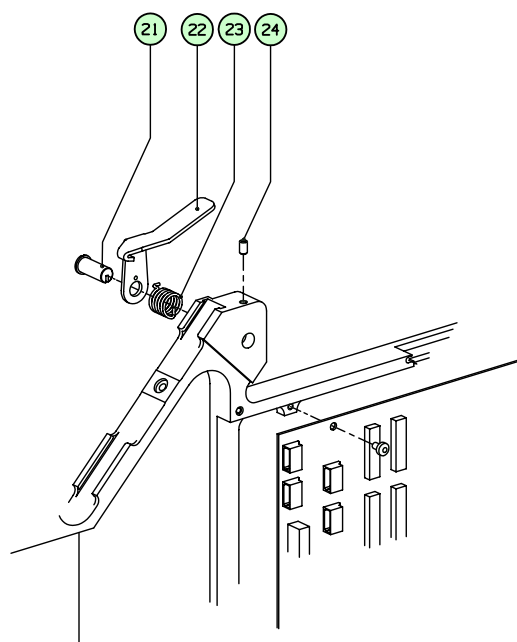


FIGURE 6.6.7.

Replacement: Bulk Cassette Clamp

---

### 6.6.8 Human Interface

<b>Item</b>	■ 26
<b>Frequency</b>	■ Only when defective
<b>Tools</b>	■ None
<b>Precautions</b>	■ Operate in an ESD safe area ■ Operate in a clean area

#### Instructions:

- Remove the side plate from the feeder
- Disconnect the flat cable from the connector on the Controller PCB (29).
- The Human Interface is glued (self adhesive) into the base. Remove the Human Interface and the remains that are left behind in the chamber.
- Remove the self-adhesive cover from the bottom of the Interface and place the new Human Interface into position. Connect the flat cable to the Controller PCB.

---

## Replacement Instructions

---

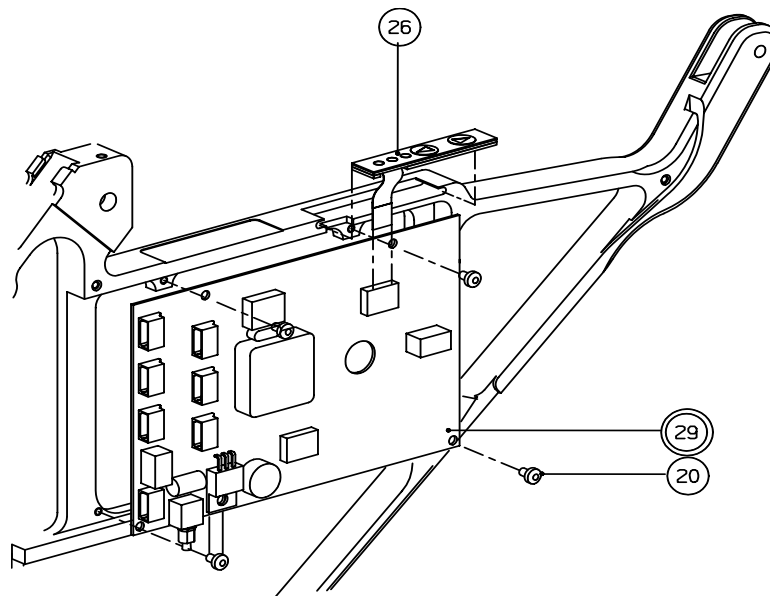


FIGURE 6.6.8. Replacement: Human Interface

---

### 6.6.9 Interface set

#### 6.6.9.1 Handle + Cable

Item	■ 27-1, 27-2, 27-3, 27-4, 27-5, 27-6, 27-7.
Frequency	■ Only when defective
Tools	■ Special Tool: Nylon cord or fisherman's cord (~1.5mm diameter) ■ Dowel Punch (~1.5mm) ■ Hammer
Precautions	■ None

---

## Replacement Instructions

---

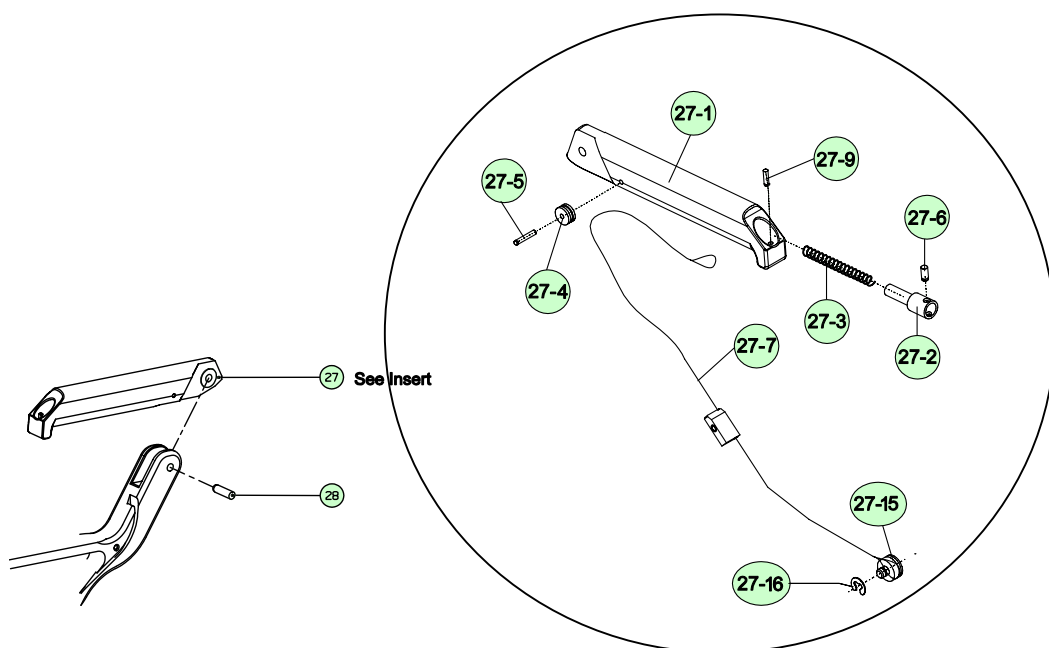


FIGURE 6.6.9. Ia+b

Interface Set (Handle)

The instructions below describe the complete procedure for taking the handle apart and disconnecting it from the cable. Extract any necessary part of the procedure, required for the replacement procedure of the part that is applicable to you.

### Instructions:

- At the bottom of the feeder, disconnect the cable from the cable holder (27-15).
- When the cable holder (27-15) needs to be replaced, disconnect it from the feeder clamp mechanism by removing circlip (27-16).
- Remove dowel (28) from feeder housing (See left hand drawing). Use punch.
- Set dowel pin (27-9) downward, by using punch + hammer, to release cable-holder (27-2). The dowel pin does not need to be taken out and can be left behind in the handle.

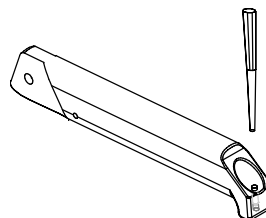


FIGURE 6.6.9. Ic.

Setting dowel pin downward in handle

---

## Replacement Instructions

---

Move pin (27-6) downward by means of hammer + punch to disconnect the cable from the top end cable holder (27-2). Pin does not have to be removed from this holder.

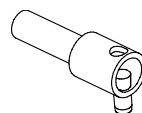


FIGURE 6.6.9.1d.

Setting dowel pin downward in cable holder

---

- The spring has to be removed from the cable. This can be done in two ways:
  1. Slide the spring over the cable.
  2. Rotate the spring from the cable (this one is shown in figure 6.69.1e).

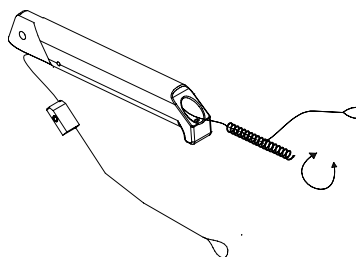


FIGURE 6.6.9.1e.

Removing the spring from the cable.

---



**NOTE:** Handle both situations with care, do not deform the spring. Rotating the spring from the cable (or onto) will cause in general the least damage to the spring.

- Pull the cable through the handle to remove the cable.
- Remove the pin (27-5), with a punch, to remove roller (27-4). It is easier to insert the new cable if the roller is removed. This action can also be done if the roller needs to be replaced.

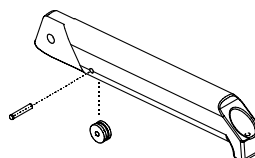


FIGURE 6.6.9.1f.

Removing the spring from the cable.

---

---

## Replacement Instructions

---

- If the cable was replaced, the top part of the cable is the small loop end. Insert this part into the rear of the handle and push it through the handle. The loop has to be 'flattened' to perform this action



**TIP:** A practical tip is to use a fisherman's cord (see example) or similar item to pull the cable through the handle.

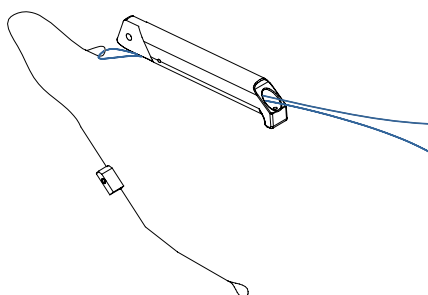


FIGURE 6.6.9. Ig.

Pulling the cable through the handle.

- All further assembly actions are performed in reverse order.

### 6.6.9.2 Clamp Unit

Item	■ 27-12
Frequency	■ Only when damaged, defective
Tools	■ Punch, Hammer ■ Allen key 1mm.
Precautions	■ None

#### Instructions:

- Remove dowel (37) to disconnect the clamp unit.
- Loosen set-screw (1) to release pen (38).
- The spring and O-ring can be removed now as well.
- Assemble in reverse order

---

## Replacement Instructions

---

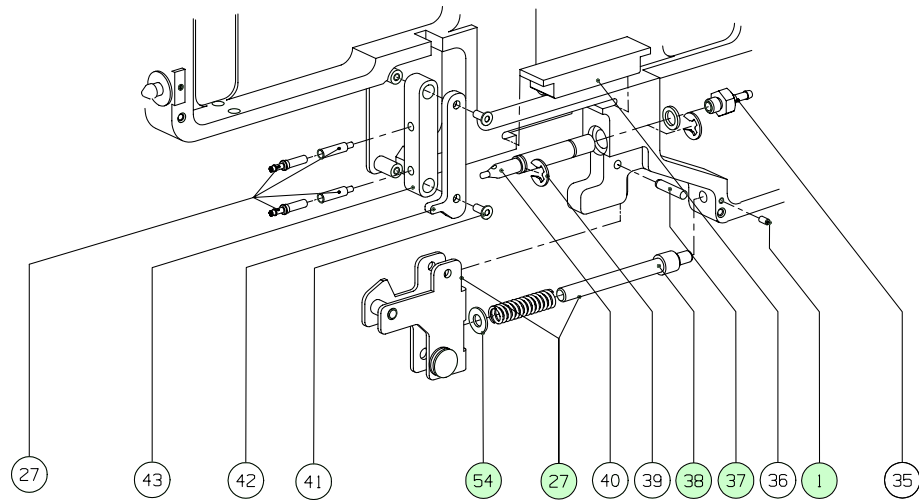


FIGURE 6.6.9.2.

Interface Set (Clamp)



**NOTE:** The spring pressure keeps the dowel into position. When disconnecting the dowel, the spring might release itself in any direction. Take care that actions are taken to hold the spring into position.

### 6.6.9.3 Electrical Interface

<b>Item</b>	■ 27-10, 27-11
<b>Frequency</b>	■ When lost or damaged
<b>Tools</b>	■ Soldering Iron, Soldering Tin ■ Torx No. 9
<b>Precautions</b>	■ When electrical wiring is touched, perform this in an ESD safe area.

#### Instructions:

- The pins (27a) can be pulled out by hand. When inserting the pins, take care that they are fully inserted until the hard stop.
- The pin housing (27b) are pressed into the contact block. The wiring must be de-soldered first before removing these housings. This procedure is written in section 6.6.14.



---

## Replacement Instructions

---

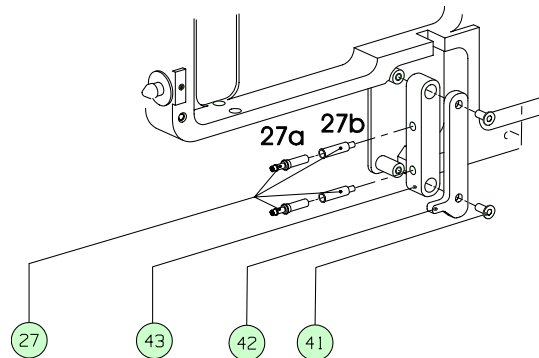


FIGURE 6.6.9.3.

Interface Set (Clamp)

---

### 6.6.10 Control Unit

Item	■ 29
Frequency	■ Only when defective
Tools	■ Torx No. 9
Precautions	■ Work in ESD safe area. ■ Do NOT pull the cables from the PCB by the cord. Pull the connector housing only.

#### Instructions:

- Disconnect all cables from the PCB.
- Remove screws (20)



**NOTE:** Check the PCB for correct strap settings (see adjustments, Chapter 7).

---

## Replacement Instructions

---

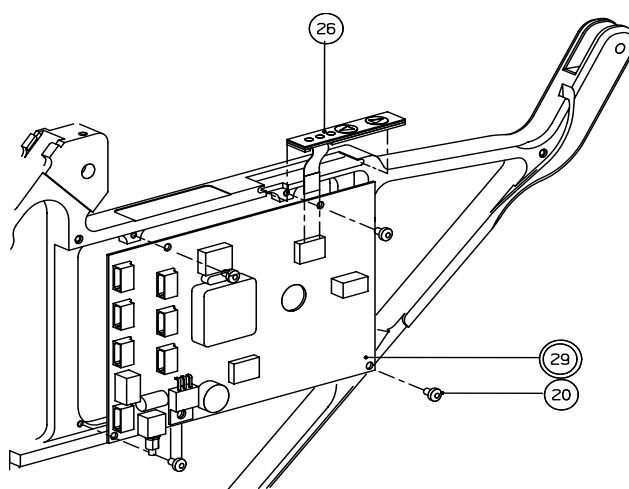


FIGURE 6.6.10.

Replacement: Control Unit

---

### 6.6.11 Valve assemblies

[Single Lane Bulk feeders are equipped with two valves only]

<b>Item</b>	■ 30
<b>Frequency</b>	■ Only when defective
<b>Tools</b>	■ Torx No. PB 400/6 ■ Wrench 7mm.:
<b>Precautions</b>	■ If hose is damaged, replace hose. Hose length is pre-defined. Replace with correct length when damaged. See section 6.6.16.

#### Instructions:

- Remove screws (33) from the defective valve
- Disconnect the L-(34), or T-Connector (32) from the bottom of the defective valve. The air hoses can remain connected.
- Disconnect the M3 Air Nipple (31) from the top of the valve. If the valve was disconnected from the previous removed L- and T-Connector, the hose can remain attached to the M3 Air Nipples by turning the valve around instead of the Air Nipple.
- Assemble in reverse direction.

---

## Replacement Instructions

---

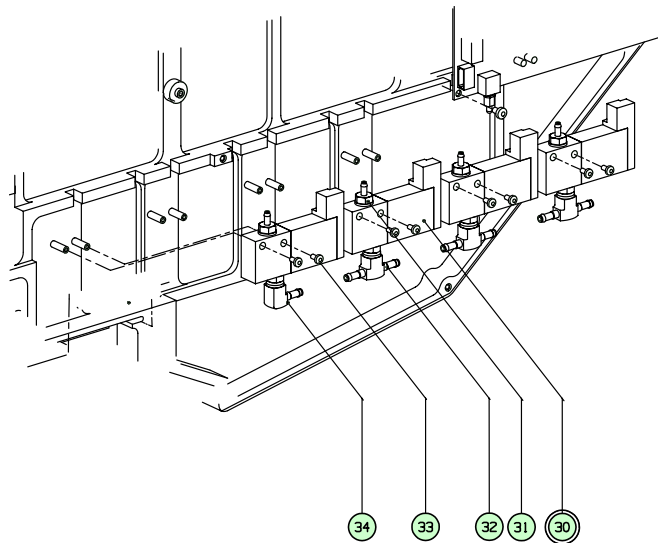


FIGURE 6.6.11.

Replacement: Valves + Hose connectors

---

### 6.6.12 Guide Block

Item	■ 36
Frequency	■ Only when lost or defective
Tools	■ None
Precautions	■ None

#### Instructions:

- Remove and add guide block by sliding the block out and in of its location.

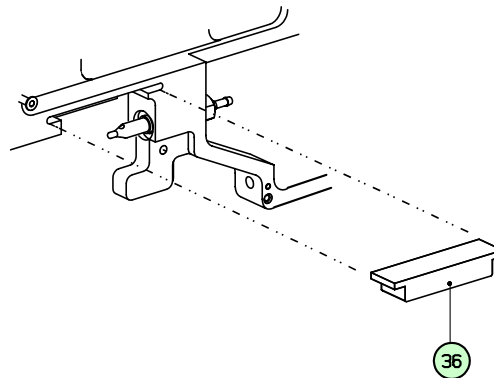


FIGURE 6.6.12.

Replacement: Guide Block

---

---

## Replacement Instructions

---

### 6.6.13 Pneumatic Pen

<b>Item</b>	■ 40
<b>Frequency</b>	■ Only when lost or defective
<b>Tools</b>	■ Wrench 7mm
<b>Precautions</b>	<ul style="list-style-type: none"><li>■ Do not use oil, grease or any kind of chemical</li><li>■ Replace in a clean environment.</li><li>■ If hose is damaged, replace hose. Hose length is pre-defined. Replace with correct length when damaged. See section 6.6.16.</li></ul>

#### Instructions:

- Remove the air hose (45) from the nipple (35) of the pneumatic pen.
- Remove the circlip from the inside of the feeder housing (item 39b).
- Remove with a wrench the nipple (35).
- From the inside of the feeder, push the pneumatic outward (to the front of the twin bulk feeder) in order to remove.
- Remove circlip (39a) to put on the new pneumatic pen.
- Replace pneumatic pen in reverse order. Insert the outer circlip (39a) on the new pneumatic pen before adding it to the feeder.

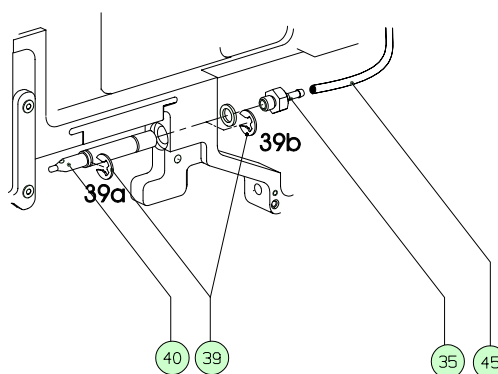


FIGURE 6.6.13.

Replacement: Guide Block

---

## Replacement Instructions

---

### 6.6.14 Feeder Guide Pin + Electrical Interface

<b>Item</b>	■ 41, 42, 43
<b>Frequency</b>	■ Only when lost or defective
<b>Tools</b>	■ Torx No. 9 ■ Soldering Iron ■ Soldering Tin
<b>Precautions</b>	■ Work in clean and ESD safe area. ■ Do not use any chemicals, grease or oil

#### Instructions:

- Remove screws (41)
- Remove (and/or replace) the guide pin (42)
- Remove the contact pins (27-11) from the interface block (43).
- At the rear end, de-solder the wires from the rear end of the contact pin housing.
- Push the contact pin housings (27-10) out of the housing block and insert them on the same location of the new housing block.
- Place the housing block into position, add the guide pin and secure by screws (41).
- Solder the wires to the housing pins according to figure:
  - Blue: Ground wire
  - White: 0 VDC Return
  - Brown: +12 VDC.

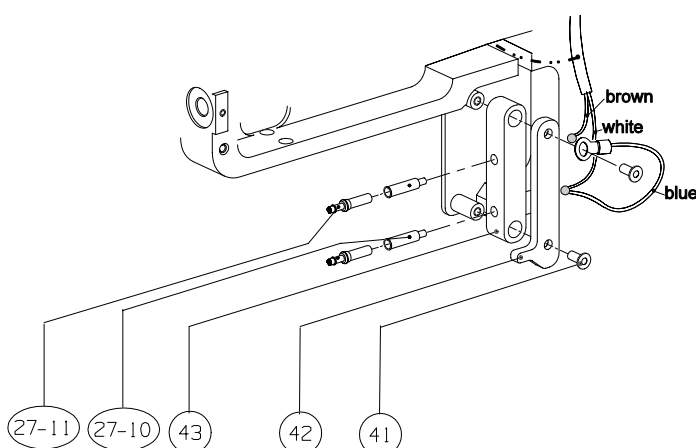


FIGURE 6.6.14.

Replacement: Feeder Guide Pin + Electrical Interface

---

## Replacement Instructions

---

### 6.6.15 Cylinder

<b>Item</b>	■ 55
<b>Frequency</b>	■ Only when defective
<b>Tools</b>	■ Socket wrench 10mm ■ Wrench 7mm
<b>Precautions</b>	■ If hose is damaged, replace hose. Hose length is pre-defined. Replace with correct length when damaged. See section 6.6.16.

#### Instructions:

- Remove the hose from the air nipple (31)
- With a socket wrench, remove the cylinder
- Remove air nipple M3 (31).
- Add air nipple to new cylinder
- Add, with a socket wrench, the new cylinder to the housing.
- Connect the air hose to the air nipple.

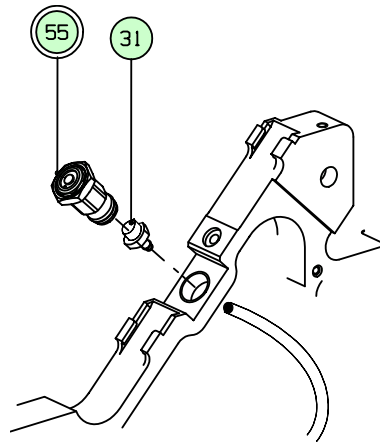


FIGURE 6.6.15.

Replacement: Cylinder.

---

## Replacement Instructions

---

### 6.6.16 Hose Lengths

Item	■ A through T
Frequency	■ When damaged after replacement
Tools	■ Cutting tool (for cutting hose)
Precautions	■ Avoid moist, dirt. ■ Work in clean environment. ■ Make sure hose is not stored in dusty environment (dust in hose).

Refer to figure 6.6.16 for hose identification.



**NOTE:** For some feeders hose lengths are divided by a restriction. The combined cell provides the total length when such a restriction is not applicable.

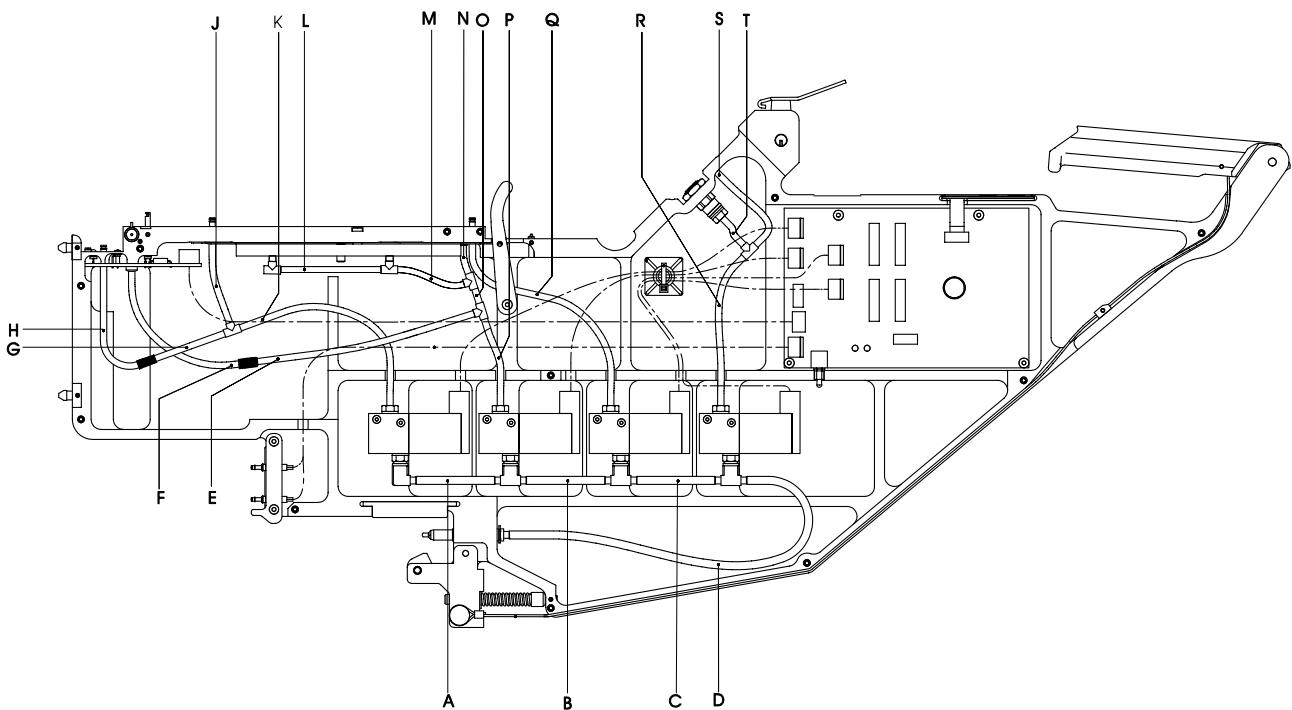


FIGURE 6.6.16.

Hose Lengths.

## Replacement Instructions

HOSE	PA2648 /35, /45	PA2648 /00, /50, /60	PA2648 /70	PA2648 /80, /85	PA2648 /90, /95
A	-	39	39	39	39
B	94	39	39	39	39
C		39	39	39	39
D	20.5	20.5	20.5	20.5	20.5
E	60	60	206	70	206
F	120	120		120	
G	-	18	110	24	110
H	-	120		120	
J	-	42.5	42.5	42.5	42.5
K	-	113	113	113	113
L	-	49.2			
M	-	48.5			
N	33	15	-	-	-
O		25	40	40	40
P	46	30	31.5	31.5	31.5
Q	-	123	123	123	123
R	67	67	67	67	67
S	55	55	55	55	55
T	30	30	30	30	30

[All sizes in millimeters]

TABLE 6.6.16.

Hose Lengths (lengths in mm).



**NOTE:** Most hose lengths are not critical. However, for the following hoses the length is critical as they define the build-up of air for cylinder timing and movement:

- Hose F = 120mm
- Hose H = 120mm
- The combination hoses EF and GH



---

**CHAPTER 7 Measuring and Adjusting Data**

---

**7.1 Spare Parts**

Before delivery, all spare parts that require adjustments are adjusted and measured before delivery. Therefore, ordered material requires no additional adjustment for the part itself. The only part where this is applicable to is the printed circuit board. Only one type of PCB is stocked, however, the timings differ per twin bulk feeder type. The settings for the switch on the PCB can be found in this chapter

**7.2 Adjustments****7.2.1 Adjustments.**

The layout of the PCB controller is as shown in figure 7.2.1.

- S1: On/Off switch: Position 1 is OFF, Position 2 is ON, Position 3 is AIR.. This switch is for FCM-1 compatibility. The switch should always be set to ON.
- S2: Selects the correct Twin Bulk Feeder program. If a new print is placed into a bulk feeder. Set this switch correctly.

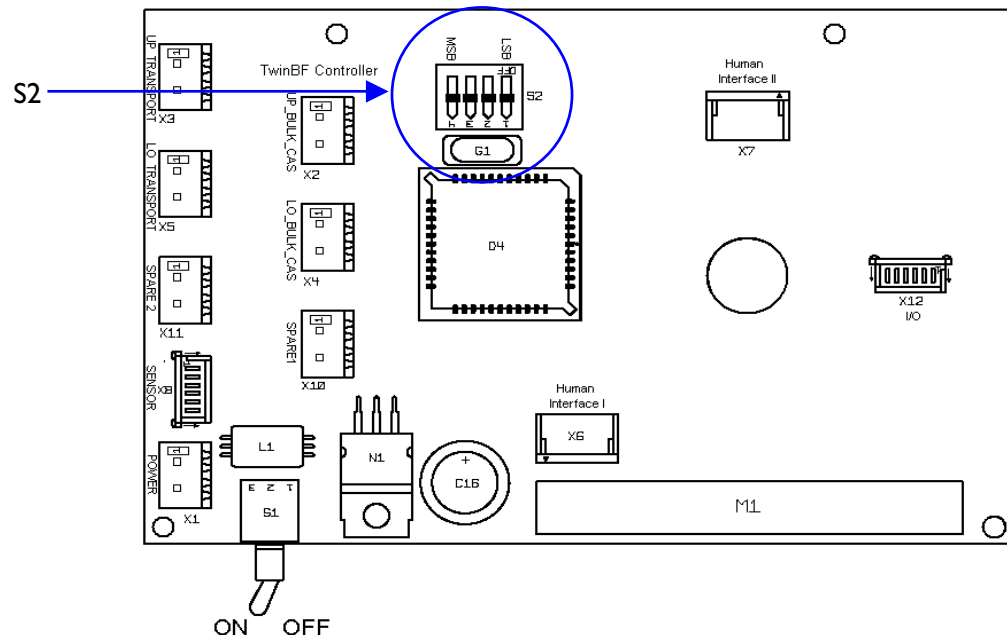
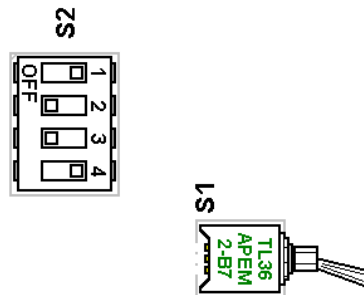


FIGURE 7.2.1.

PCB layout

### 7.2.1.0 PA2648/00: C020I PCB Settings



### 7.2.1.1 PA2648/35: C0805T1.25 PCB Settings

For the PA2648/35 C0805T1.25 Single Lane Bulk Feeder, the PCB settings are set as shown in figure 7.2.1.1.

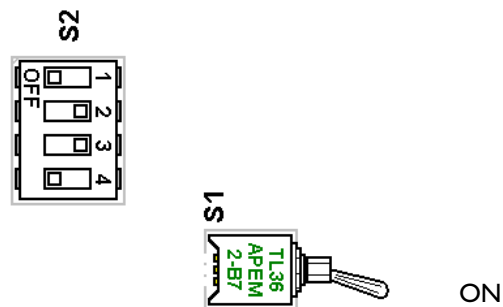


FIGURE 7.2.1.1

PA2648/35: C0805T1.25 PCB Settings

### 7.2.1.2 PA2648/45: Melf 0805 PCB Settings

For the PA2648/35 Melf 0805 Single Lane Bulk Feeder, the PCB settings are set as shown in figure 7.2.1.2.

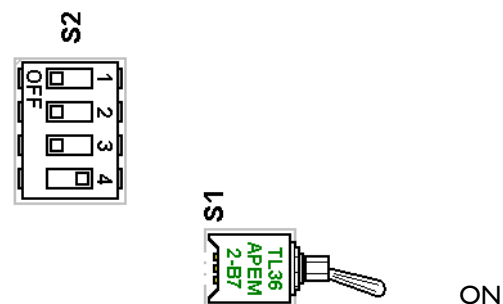


FIGURE 7.2.1.2

PA2648/45: Melf 0805 PCB Settings

### 7.2.1.3 PA264850: C0402 PCB Settings

For the PA2648/50 C0402 Twin Lane Bulk Feeder, the PCB settings are set as shown in figure 7.2.1.3.

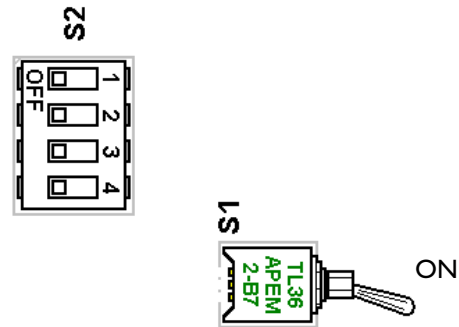


FIGURE 7.2.1.3

PA2648/50: C0402 PCB Settings

---

### 7.2.1.4 PA2648/60: R0402 PCB Settings

For the PA2648/60 R0402 Twin Bulk Feeder, the PCB settings are set as shown in figure 7.2.1.4.

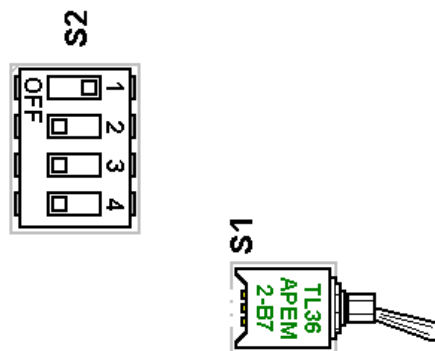


FIGURE 7.2.1.4

PA2648/60: R0402 PCB Settings

---

### 7.2.1.5 PA2648/70: C0603 PCB Timers Settings

For the PA2648/70 C0603 Twin Bulk Feeder, the PCB timers are set as shown in figure 7.2.1.5. Switch S1 must be set into its 'ON' position.

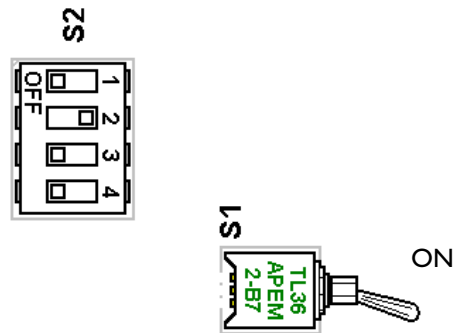


FIGURE 7.2.1.5

PA2648/70: C0603 PCB Settings

### 7.2.1.6 PA2648/80: R0603 PCB Settings

For the PA2648/80 R0603 Twin Bulk Feeder, the PCB settings are set as shown in figure 7.2.1.6.

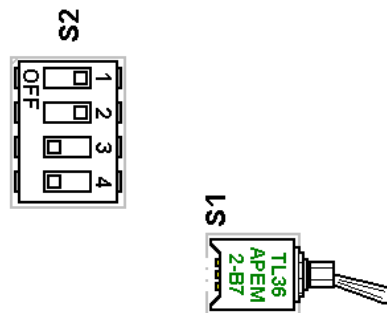


FIGURE 7.2.1.6

PA2648/80: R0603 PCB Settings

### 7.2.1.7 PA2648/85: Melf 0604 PCB Settings

For the PA2648/85 MELF 0604 Twin Bulk Feeder, the PCB timers are set as shown in figure 7.2.1.7. Switch S1 must be set into its 'ON' position.

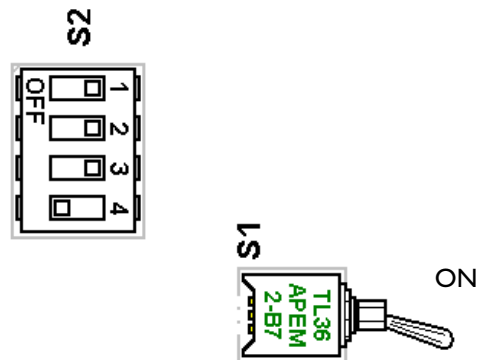


FIGURE 7.2.1.7

PA2648/85: Melf 0604 PCB Settings

### 7.2.1.8 PA2648/90: C0805T0.6 PCB Settings

For the PA2648/90 C0805T0.6 Twin Bulk Feeder, the PCB timers are set as shown in figure 7.2.1.8. Switch S1 must be set into its 'ON' position.

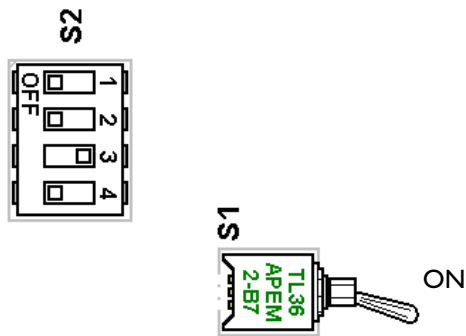


FIGURE 7.2.1.8

PA2648/90: C0805T0.6 PCB Settings

### 7.2.1.9 PA2648/95: R0805 PCB Settings

For the PA2648/95 R0805 Twin Bulk Feeder, the PCB timers are set as shown in figure 7.2.1.9. Switch S1 must be set into its 'ON' position.

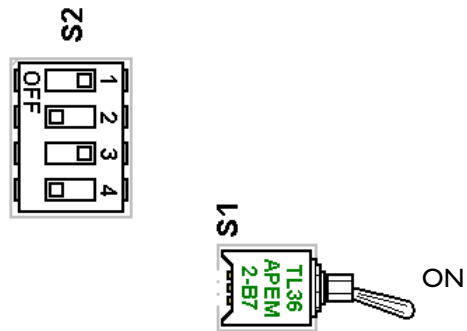


FIGURE 7.2.1.9

PA2648/95: R0805 PCB Settings

---

**CHAPTER 8 Spare Parts List**

---

**8.1 Module Overview**

The spare parts detailed in section 8.3 are divided into the modules as mentioned in Chapter 3.

**8.2 Repair**

The Twin Bulk Feeder is **only** local repairable for those items identified as a spare part. Other parts of the feeder require special production tools for replacement and can only be performed centrally. For all parts that need to be replaced, which are not mentioned in the spare parts list, the feeder can be send for customized repair via the following service number.

Feeder Commercial Number	Service Number
PA2648/35: C0805T1.25 FCM-II Single Lane Bulk Feeder	9965 000 01008
PA2648/45: MELF 0805 FCM-II Single Lane Bulk Feeder	9965 000 04657
PA2648/50: C0402 FCM-II Twin Bulk Feeder	9965 000 01007
PA2648/60: R0402 FCM-II Twin Bulk Feeder	9965 000 04658
PA2648/70: C0603 FCM-II Twin Bulk Feeder	9965 000 01006
PA2648/80: R0603: FCM-II Twin Bulk Feeder	9965 000 04689
PA2648/85: MELF 0604 FCM-II Twin Bulk Feeder	9965 000 04690
PA2648/90: C0805T0.6 FCM-II Twin Bulk Feeder	9965 000 01005
PA2648/95: R0805 FCM-II Twin Bulk Feeder	9965 000 07122

TABLE 8.2.

Repair Numbers

The lifetime of a Twin Bulk Feeder is, except the bulk cassette, 10 million picks. To extend this lifetime, Philips offers repair and adjustments for critical and non-local repairable parts for every 10 million picks for a maximum of 5 times. The above mentioned Service Number can be used for this purpose.

**Repair Conditions:**

- The bulk cassette is a separate commercial available item and has a lifetime of maximum 5 million indexes. The bulk cassette is not included in the repair and is not exchanged when offered for repair.
- During repair, feeders will be upgraded to the latest functional status.
- Repair feeders will be rejected when;
  - ☐ Feeder is incomplete and parts are missing
  - ☐ Feeders are not returned in proper packaging where damage could occur during transport.

---

## Spare Parts List

---

### 8.3 Spare Parts Lists

The fields in the spare parts list have the following meaning:

<b>Item No.</b>	:	Position Identification
<b>Part of Item No.:</b>		Module the part belongs to.
<b>Ordering Code</b>	:	The order code at Philips t.b.d. = to be defined. Code number not available yet.
<b>Description</b>	:	Description of the article
<b>Qty/Mod</b>	:	The quantity of the part in one module
<b>PI</b>	:	If 'Y', the part must be stocked regionally
<b>Serv. Instr.</b>	:	If 'Y', a service instruction, maintenance or replacement instruction is available.
<b>Remarks</b>	:	<ol style="list-style-type: none"><li>1. Comment or specific information</li><li>2. 'Per Order Article', article with long lead time.</li><li>3. Standard Packing Unit: Minimum packing quantity.</li></ol>



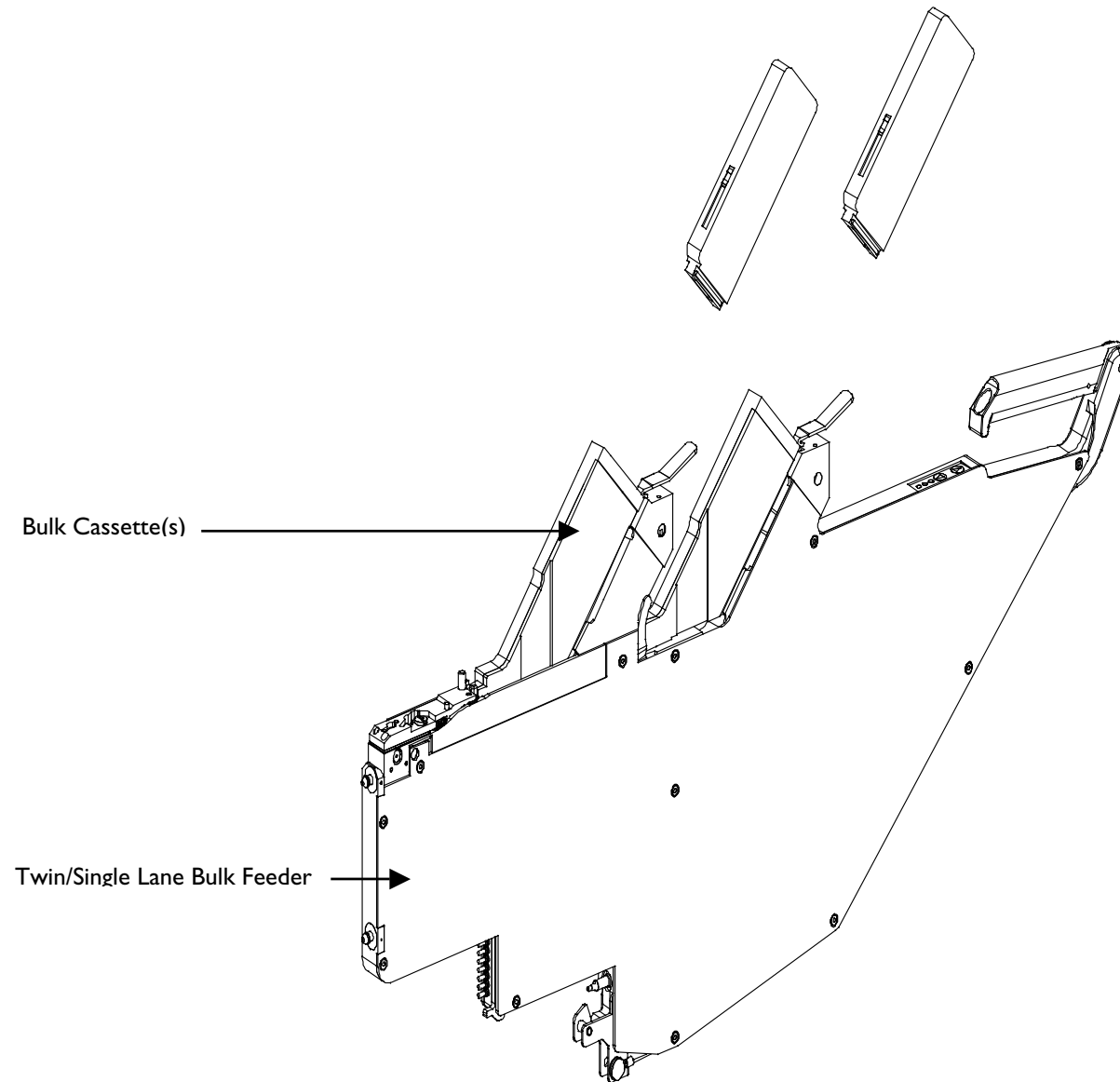
---

## **Spare Parts List**

---

**Intentionally left blank**

---



## Twin/Single Lane Bulk Feeder Commercial Numbers:

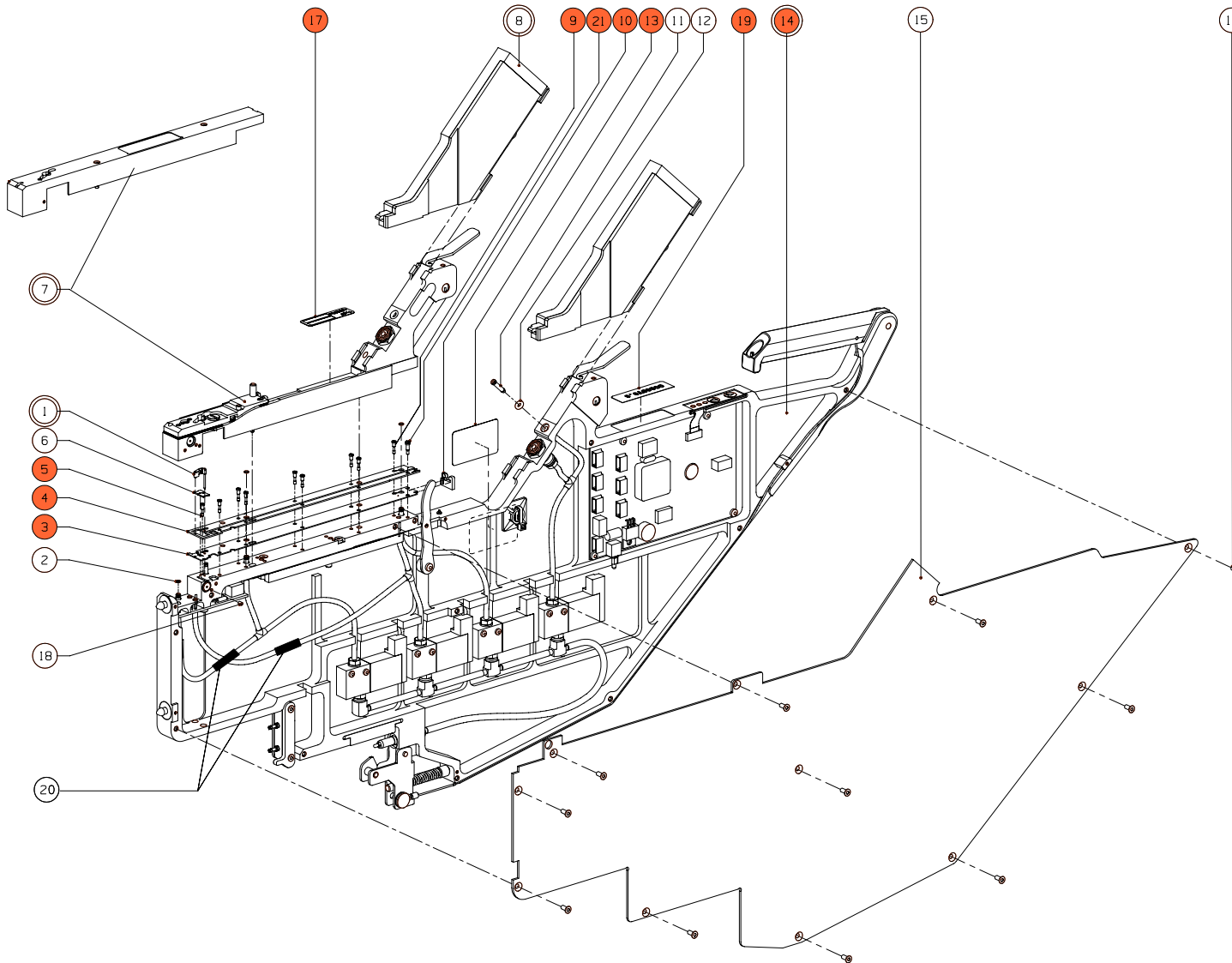
Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..								PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95		
-	-	9466 026 48001	Twin Bulk Feeder C0201	I											Equivalent to PA2648/00
-	-	9466 026 48501	Twin Bulk Feeder C0402				I								Equivalent to PA2648/50
-	-	9466 026 48601	Twin Bulk Feeder R0402					I							Equivalent to PA2648/60
-	-	9466 026 48701	Twin Bulk Feeder C0603						I						Equivalent to PA2648/70
-	-	9466 026 48801	Twin Bulk Feeder R0603							I					Equivalent to PA2648/80
-	-	9466 026 48851	Twin Bulk Feeder MELF 0604								I				Equivalent to PA2648/85
-	-	9466 026 48901	Twin Bulk Feeder C0805T0.6									I			Equivalent to PA2648/90
-	-	9466 026 48351	Single Lane Bulk Feeder C0805T1.25		I										Equivalent to PA2648/35
-	-	9466 026 48451	Single Lane Bulk Feeder MELF 0805			I									Equivalent to PA2648/45
-	-	9466 026 48951	Twin Bulk Feeder R0805										I		Equivalent to PA2648/95

## Bulk Cassettes Commercial Numbers:

Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..								PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95		
-	-	5322 693 11306	Bulk Cassette C0402				2								Equivalent to PA2637/00
-	-	5322 693 11307	Bulk Cassette R0402					2							Equivalent to PA2637/05
-	-	5322 693 11308	Bulk Cassette C0603						2						Equivalent to PA2637/10
-	-	5322 693 11309	Bulk Cassette R0603							2					Equivalent to PA2637/15
-	-	4022 591 17990	Bulk Cassette MELF 0604								2				Equivalent to PA2637/85
-	-	5322 693 11311	Bulk Cassette C0805T0.6/ R0805									2	2		Equivalent to PA2637/20
-	-	5322 693 11312	Bulk Cassette C0805T1.25		I										Equivalent to PA2637/25
-	-	4022 591 17980	Bulk Cassette MELF 0805			I									Equivalent to PA2637/45
-	-	4022 591 06450	Bulk Cassette C0201	2											Equivalent to PA2637/50

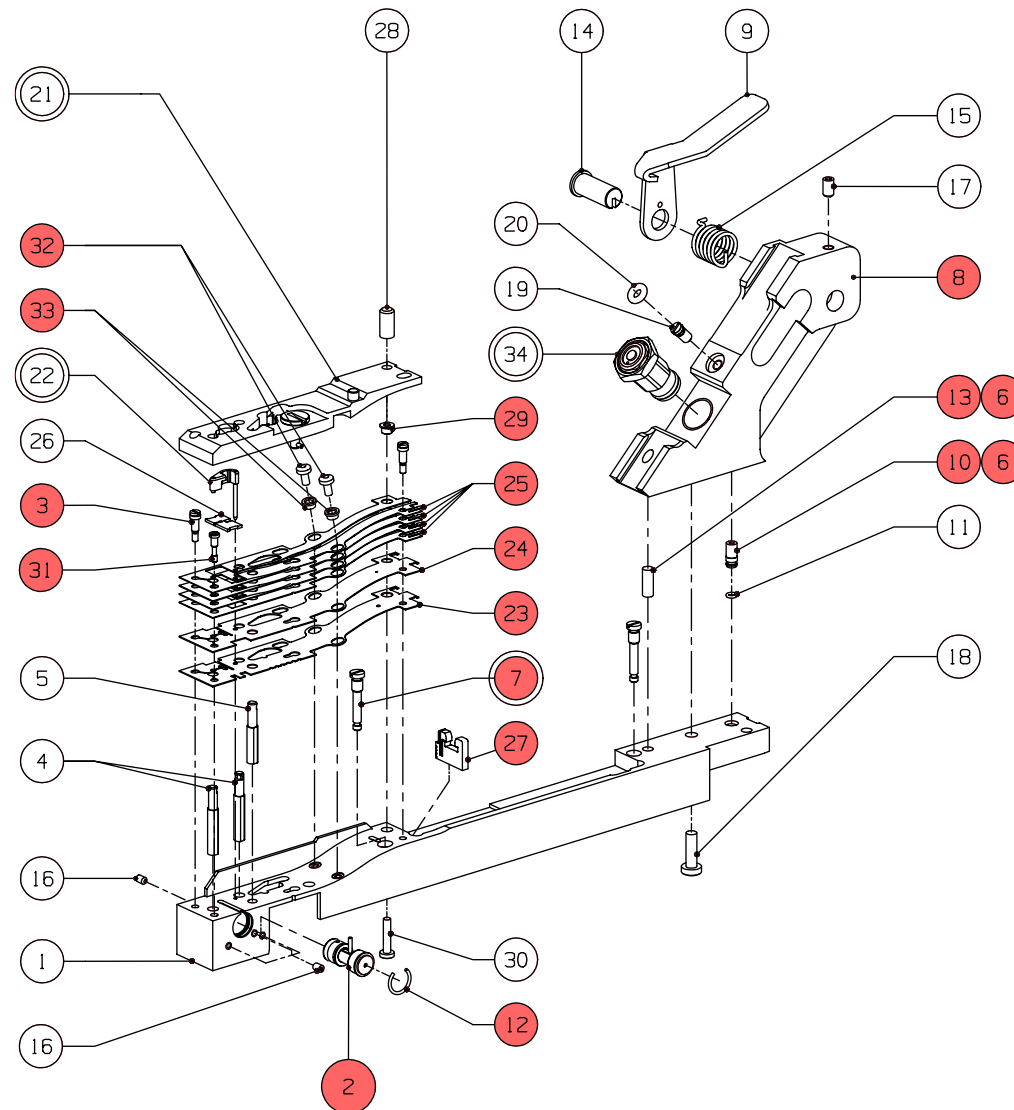
## Customized Repair numbers: [Customized repair excludes repair of the Bulk Cassette]

Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..								PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95		
-	-	9965 000 01007	Repair Twin Bulk Feeder C0402				I								
-	-	9965 000 04658	Repair Twin Bulk Feeder R0402					I							
-	-	9965 000 01006	Repair Twin Bulk Feeder C0603						I						
-	-	9965 000 04689	Repair Twin Bulk Feeder R0603							I					
-	-	9965 000 04690	Repair Twin Bulk Feeder MELF 0604								I				
-	-	9965 000 01005	Repair Twin Bulk Feeder C0805T0.6									I			
-	-	9965 000 01008	Repair Single Lane Bulk Fdr C0805T1.25		I										
-	-	9965 000 04657	Repair Twin Bulk Feeder MELF 0805			I									
-	-	9965 000 07122	Repair Twin Bulk Feeder R0805										I		
-	-	9965 000	Repair Twin Bulk Feeder C0201	I											



Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..									PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95			
1	I	5322 402 11258	Fork Assembly, Lower Feeder	I	I	I	I	I	I	I	I	I	I		Y	
2	2	5322 530 51146	O-Ring 1.8 x 0.7	3			3	3	3	3	3	3	3		Y	
		4022 514 27040	Slider C0201	I												
6	6	5322 463 11242	Slider, Lower Feeder C0402				I								Y	
6	6	4022 514 26130	Slider, Lower Feeder R0402					I							Y	
6	6	5322 463 11243	Slider, Lower Feeder C0603						I						Y	
6	6	4022 514 26140	Slider, Lower Feeder R0603							I						
6	6	4022 514 26380	Slider Lower Feeder MELF 0604								I					
6	6	5322 463 11261	Slider, Lower Feeder C0805/R0805									I	I		Y	
6	6	4022 514 25720	Slider, Lower Feeder 0805T1.25		I	I									Y	
		4022 514 26520	Upper Feeder Assy C0201	I												
7	7	5322 693 11573	Upper Feeder Assembly C0402				I								Y	See Module 7 for parts
7	7	4022 514 26440	Upper Feeder Assembly R0402					I							Y	See Module 7 for parts
7	7	5322 693 11574	Upper Feeder Assembly C0603						I						Y	See Module 7 for parts
7	7	4022 514 26460	Upper Feeder Assembly R0603							I						See Module 7 for parts
7	7	4022 514 26470	Upper Feeder Assembly MELF 0604								I					See Module 7 for parts
7	7	5322 693 11603	Upper Feeder Assembly C0805T0.6									I	I		Y	See Module 7 for parts
7	7	4022 514 26500	Lower Feeder Cover C0805T1.25		I										Y	
7	7	4022 514 26500	Lower Feeder Cover MELF 0805			I										
8	8	See Page 8-6	Bulk Cassettes												Y	See commercial numbers
11	11	5322 395 10764	Hose Pillar Restriction 0.25	I			I	I							Y	
11	11	5322 395 10767	Hose Pillar Restriction 0.35						I	I					Y	
11	11	4022 514 26320	Hose Pillar Restriction 0.35 (MELF 0604)								I					
11	11	5322 395 10768	Hose Pillar Restriction 0.40									I	I		Y	
11	11	4022 514 26320	Hose Pillar Restriction 0.50		I										Y	
11	11	4022 514 26770	Hose Pillar Restriction 1.00			I										
12	12	5322 530 10436	O-Ring 2,57x1,78	I	I	I	I	I	I	I	I	I	I		Y	
15	15	5322 466 12163	Side Plate	I	I	I	I	I	I	I	I	I	I		Y	
16	16	5322 502 14455	Screw, M2.5 x 6 Sunken	14	14	14	14	14	14	14	14	14	14			
18	18	5322 502 14074	Set screw, M2x3	I	I	I	I	I	I	I	I	I	I			
20	20	5322 395 10771	Restriction 0.25	2	I	I	2	2		I	I				Y	

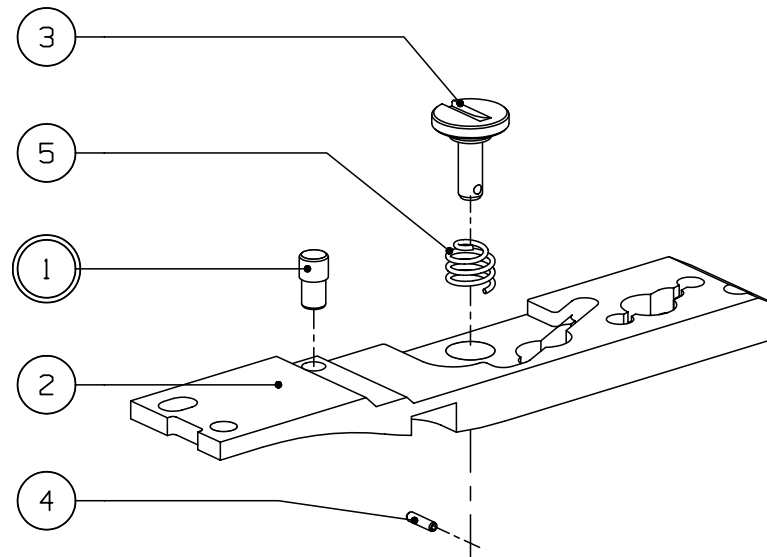
**Note:** Because of the critical adjustment required for the bulk feeding process, items 3, 4 and 9 cannot be ordered at Philips. If feeder requires repair on these items, it is recommended to return the feeder for repair. See section 8.2



[This module is not applicable to Single Lane Bulk Feeders]

Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..									PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95			
4	7	5322 132 00125	Sensors, Upper Feeder	2			2	2	2	2	2	2	2		Y	
5	7	5322 132 00124	Sensor, Lower Feeder (Transmitter)	1			1	1	1	1	1	1	1		Y	
9	7	5322 401 11796	Clamp, bulk Cassette	1			1	1	1	1	1	1	1		Y	
10	7	5322 526 10721	Nipple	1			1	1	1	1	1	1	1		Y	
11	7	5322 530 51146	O-Ring 1,8 x 0,7	1			1	1	1	1	1	1	1		Y	
14	7	5322 500 10496	Bolt, Clamp	1			1	1	1	1	1	1	1		Y	
15	7	5322 492 11732	Spring, Clamp	1			1	1	1	1	1	1	1		Y	
16	7	5322 502 14074	Set Screw, M2 x 3	3			3	3	3	3	3	3	3			
17	7	4822 502 10176	Set Screw, M3 x 5	1			1	1	1	1	1	1	1			
18	7	5322 502 21212	Screw, M3 x 10 Pan Head	1			1	1	1	1	1	1	1			
19	7	5322 535 10615	Restriction M3x0.25mm	1			1	1							Y	
19	7	5322 535 10625	Restriction M3x0.35mm						1						Y	
19	7	4022 514 25170	Restriction M3x0.40mm							1	1				Y	
19	7	5322 535 10639	Restriction M3x0.50mm									1	1		Y	
20	7	5322 530 10436	O-Ring M2,57 x 1,78	1			1	1	1	1	1	1	1		Y	
21	7	5322 442 01723	Top Cover Assembly	1			1	1	1	1		1	1		Y	parts: See Module 7-22
21	7	4022 514 24950	Top Cover Assembly MELF 0604								1				Y	parts: See Module 7-22
22	7	5322 402 11258	Fork Assembly Upper Feeder	1			1	1	1	1	1	1	1		Y	
		4022 514 27040	Slider C0201	1												
26	7	5322 463 11242	Slider, Upper Feeder C0402				1								Y	
26	7	4022 514 26130	Slider, Upper Feeder R0402					1							Y	
26	7	5322 463 11243	Slider, Upper Feeder C0603						1						Y	
26	7	4022 514 26140	Slider, Upper Feeder R0603							1					Y	
26	7	4022 514 26380	Slider, Upper Feeder MELF 0604								1				Y	
26	7	5322 463 11261	Slider, Upper Feeder C0805									1	1		Y	
28	7	5322 505 11267	Nut, Curled	1			1	1	1	1	1	1	1		Y	
30	7	5322 502 14647	Screw, M2 x 10 Pan Head	1			1	1	1	1	1	1	1			
34	7	5322 360 10437	Cylinder, Pusher Lower Bulk Cassette	1			1	1	1	1	1	1	1		Y	

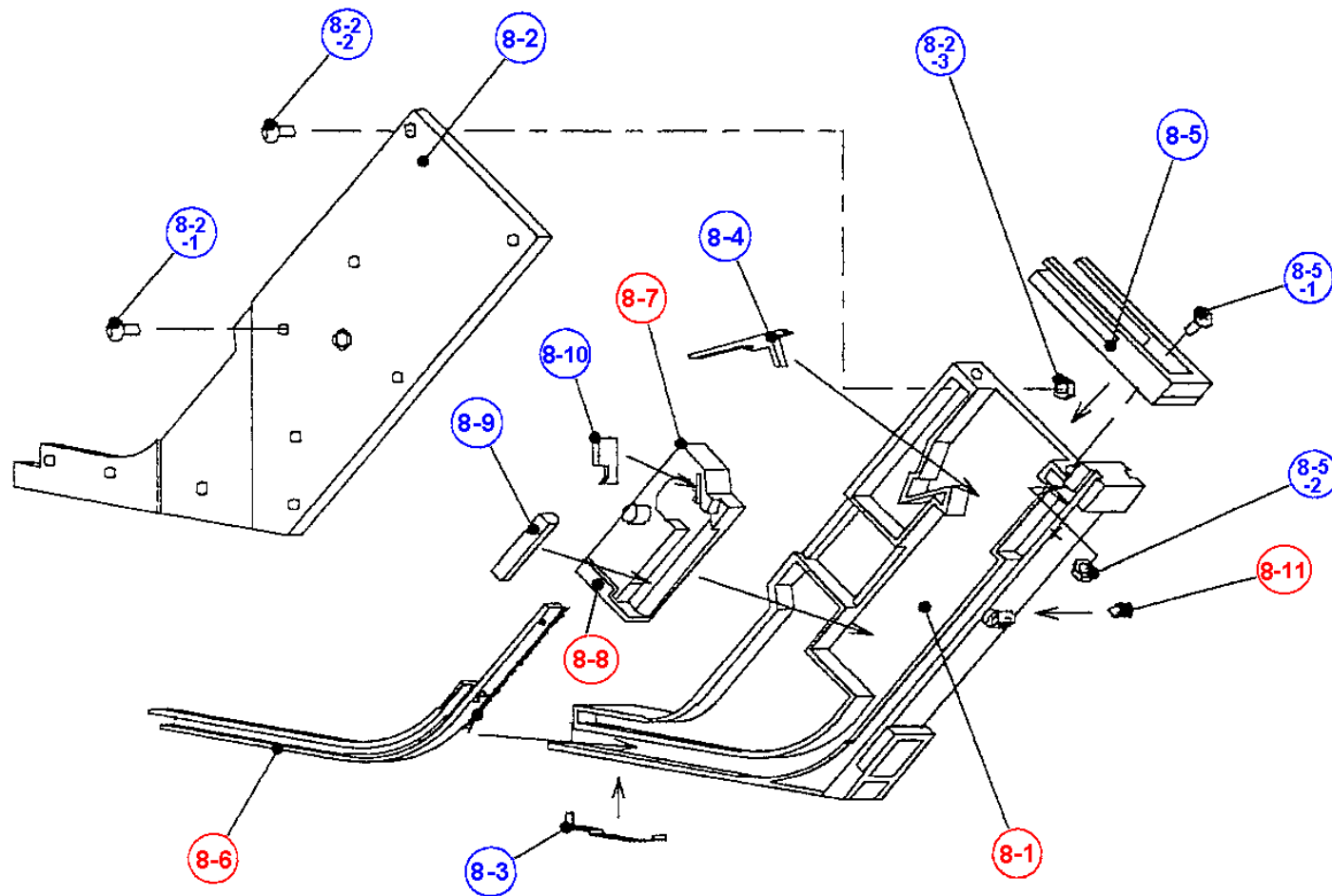
**Note:** Because of the critical adjustment required for the bulk feeding process, items 23, 24,25 and related fixing material items cannot be ordered at Philips. If feeder requires repair on these items, it is recommended to return the feeder for repair. See section 8.2



[This module is not applicable to Single Lane Bulk Feeders]

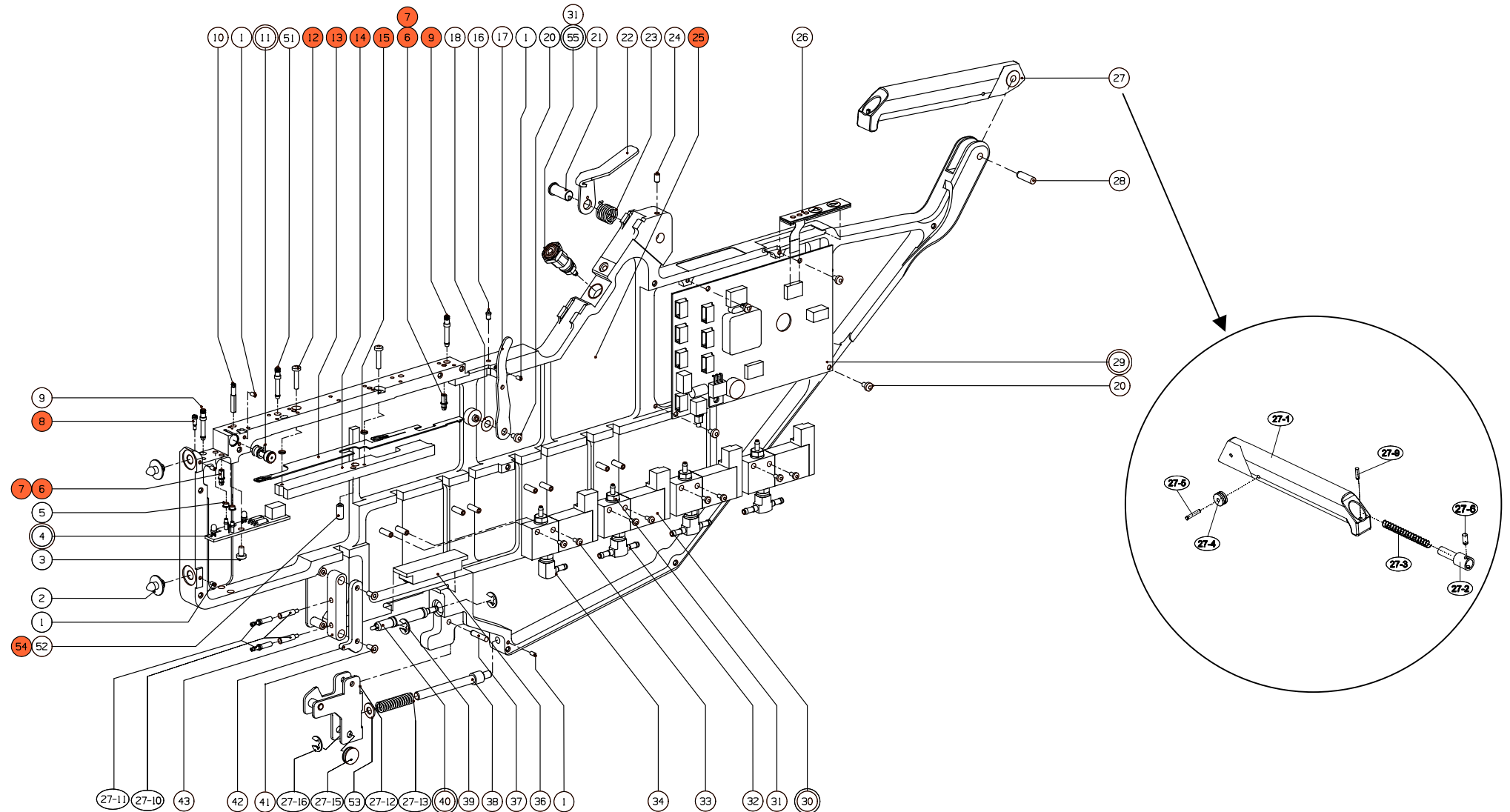


Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..									PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95			
1	7-22	5322 535 10616	X-pin	1			1	1	1	1	1	1	1		Y	
2	7-22	5322 442 01724	Cover	1			1	1	1	1		1	1		Y	
2	7-22	4022 514 26491	Cover MELF 0604	1							1					
3	7-22	5322 417 11404	Lock	1			1	1	1	1	1	1	1		Y	
4	7-22	5322 529 10425	Spring Dowel, RND 1 x 4	1			1	1	1	1	1	1	1		Y	
5	7-22	5322 492 11728	Compression Spring	1			1	1	1	1	1	1	1		Y	



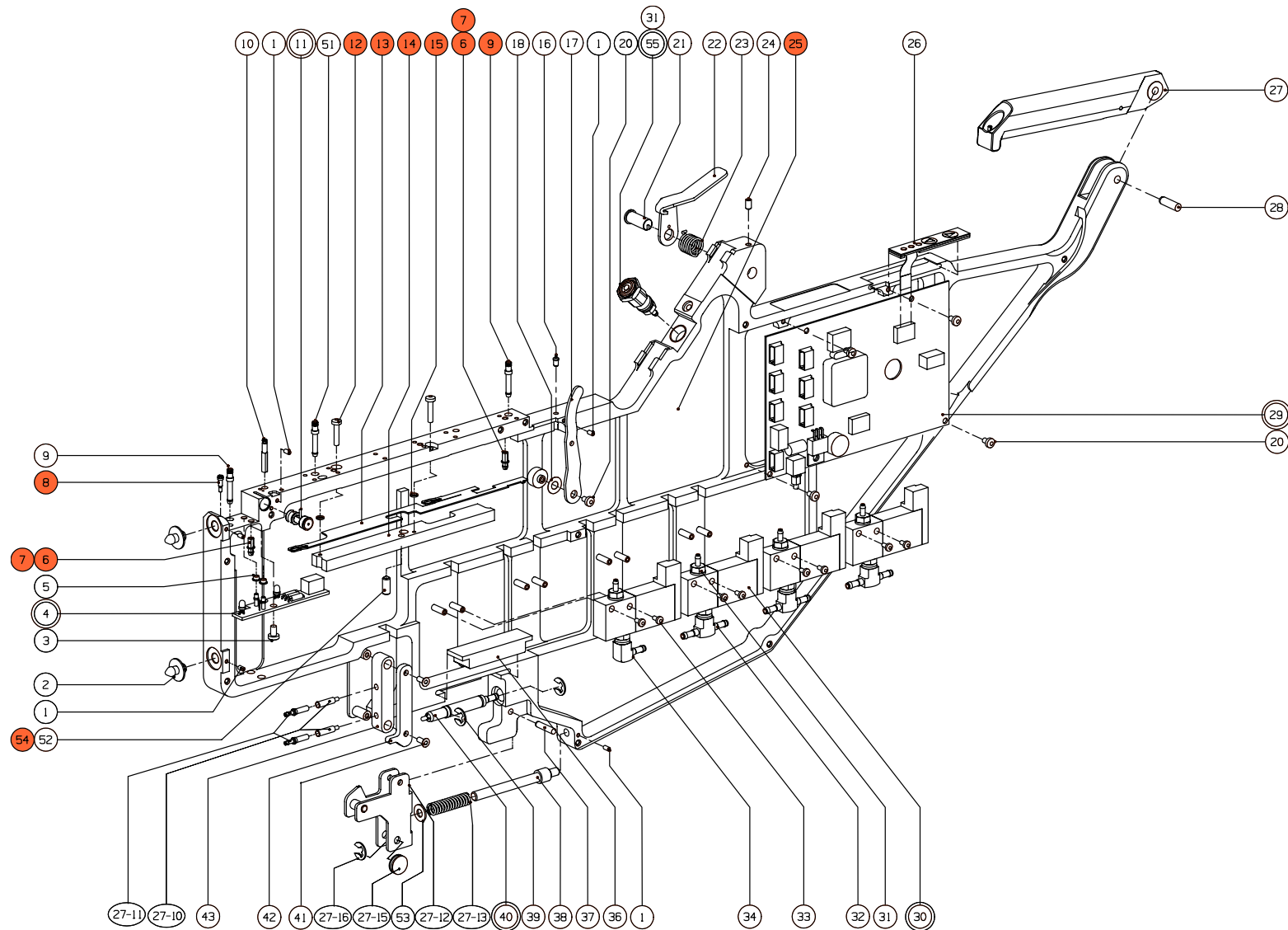
Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..									PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95			
8-2	8	5322 442 00982	Cover, Transparent	1	1	1	1	1	1	1	1	1	1		Y	
8-2-1	8-2	5322 502 14453	Screw, M2x12, Pan Head	8	8	8	8	8	8	8	8	8	8			
8-2-2	8-2	5322 502 14454	Screw, M2x10, Pan Head	2	2	2	2	2	2	2	2	2	2			Standard Packing Unit: 25
8-2-3	8-2	4822 505 10323	Nut, M2	10	10	10	10	10	10	10	10	10	10			
8-3	8	5322 462 11127	Component Stopper		1	1	1	1	1	1	1	1	1		Y	
8-4	8	5322 466 12155	Gate Support Plate C0805T1.25		1										Y	
8-4	8	5322 466 12111	Gate Support Plate C0402 / R0603				1			1					Y	
8-4	8	5322 466 12115	Gate Support Plate MELF0805								1				Y	
8-4	8	5322 466 12113	Gate Support Plate R0402					1							Y	
8-4	8	5322 466 12114	Gate Support Plate C0603 / C0805T0.6/R0805						1			1	1		Y	
8-5	8	5322 256 10384	Bulk Case Holder		1	1	1	1	1	1	1	1	1		Y	
8-5-1	8-5	5322 502 14452	Screw, M2x5, Sunken		2	2	2	2	2	2	2	2	2			Standard Packing Unit: 25
8-5-2	8-5	4822 505 10323	Nut, M2		2	2	2	2	2	2	2	2	2			
8-9	8	5322 466 12112	Moveable Block C0402				1								Y	
8-9	8	5322 466 12113	Moveable Block R0402					1							Y	
8-9	8	5322 466 12116	Moveable Block C0603						1						Y	
8-9	8	5322 466 12117	Moveable Block R0603							1					Y	
8-9	8	NM-II-0-604-0	Moveable Block MELF 0604								1				Y	
8-9	8	5322 466 12118	Moveable Block C0805T0.6/R0805									1	1		Y	
8-10	8	5322 443 11101	Moveable Gate R0402					1							Y	
8-10	8	5322 443 11102	Moveable Gate C0603						1						Y	
8-10	8	5322 443 11103	Moveable Gate R0603							1					Y	
8-10	8	5322 443 11104	Moveable Gate C0805T0.6/R0805									1	1		Y	

**Note:** Other parts of the cassette **cannot** be ordered separately



Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..									PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95			
1	14	4822 502 10004	Set Screw, M2 x 4	5	5	5	5	5	5	5	5	5	5			
2	14	5322 535 10617	Pin, Feeder Positioning	2	2	2	2	2	2	2	2	2	2		Y	
3	14	5322 502 21211	Screw, M3 x 5 Pan Head	1	1	1	1	1	1	1	1	1	1			
4	14	5322 216 04642	Sensor PCB Assembly	1	1	1	1	1	1	1	1	1	1			
5	14	5322 532 13119	Bush	2	2	2	2	2	2	2	2	2	2		Y	
9	14	5322 526 10722	Nipple M3	2			2	2	2	2	2	2	2		Y	
10	14	5322 132 00124	Sensor, Lower Feeder Receiver	1	1	1	1	1	1	1	1	1	1		Y	
16	14	5322 535 10618	Pin, Component stopper	1	1	1	1	1	1	1	1	1	1		Y	
17	14	5322 402 11259	Handle, Locking Lever	1	1	1	1	1	1	1	1	1	1		Y	
18	14	4822 530 80076	Washer, 4.2 x 9 Curved	1	1	1	1	1	1	1	1	1	1			
20	14	5322 502 14648	Screw, M2,5 x 4 Pan Head	5	5	5	5	5	5	5	5	5	5			
21	14	5322 500 10496	Bolt, Clamp	1	1	1	1	1	1	1	1	1	1			
22	14	5322 401 11796	Clamp, Bulk Cassette	1	1	1	1	1	1	1	1	1	1		Y	
23	14	5322 492 11732	Spring, Clamp	1	1	1	1	1	1	1	1	1	1		Y	
24	14	4822 502 10176	Set Screw, M3 x 5	1	1	1	1	1	1	1	1	1	1			
26	14	5322 216 04643	Human Interface	1	1	1	1	1	1	1	1	1	1		Y	
27-1	14-27	5322 498 10724	Handle	1	1	1	1	1	1	1	1	1	1		Y	
27-2	14-27	5322 256 10545	Spring bolt	1	1	1	1	1	1	1	1	1	1		Y	
27-3	14-27	5322 492 11729	Spring, Handle; PM/Lo41.9/d=0.32	1	1	1	1	1	1	1	1	1	1		Y	
27-4	14-27	5322 528 11281	Roller	1	1	1	1	1	1	1	1	1	1		Y	
27-5	14-27	5322 535 10623	Pin, Roller	1	1	1	1	1	1	1	1	1	1			
27-6	14-27	5322 535 10624	Pin, Spring Bolt	1	1	1	1	1	1	1	1	1	1			
27-10	14-27	5322 441 12308	Contact pin housing INGUN	2	2	2	2	2	2	2	2	2	2		Y	
27-11	14-27	5322 535 10575	Contact pin INGUN	2	2	2	2	2	2	2	2	2	2		Y	
27-12	14-27	5322 401 11797	Clamp	1	1	1	1	1	1	1	1	1	1		Y	
27-13	14-27	5322 492 11731	Clamp Spring 43, 5x6, 3x1	1	1	1	1	1	1	1	1	1	1		Y	
27-15	14-27	5322 256 10546	Cable Holder	1	1	1	1	1	1	1	1	1	1		Y	
27-16	14-27	5322 532 13121	Circlip for cable holder	1	1	1	1	1	1	1	1	1	1			
28	14	5322 535 94924	Dowel	1	1	1	1	1	1	1	1	1	1		Y	
29	14	5322 216 04644	Control Unit Assembly	1	1	1	1	1	1	1	1	1	1		Y	

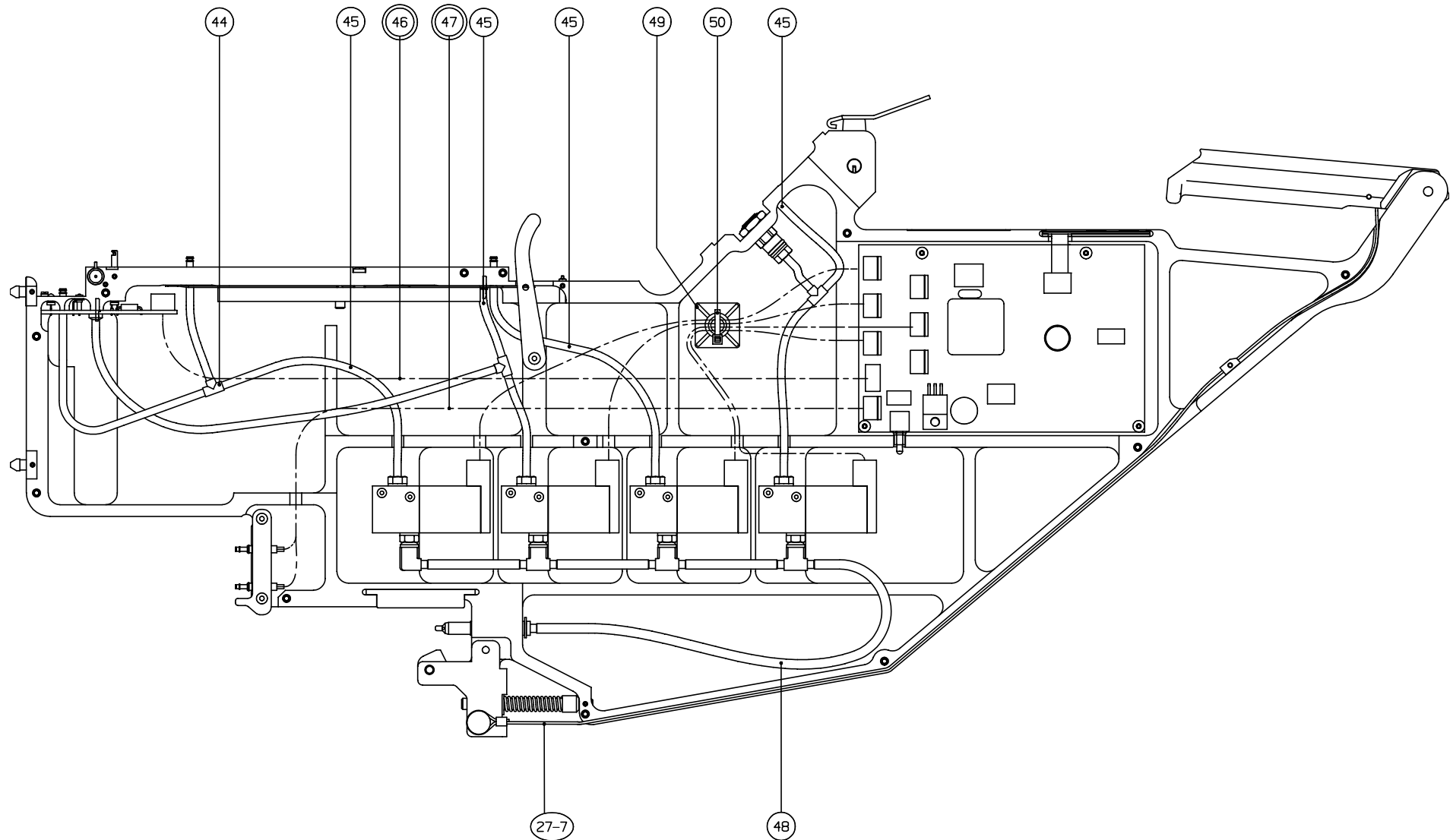
Continue on next page



(Base Block Assembly: Continued...)

Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..									PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95			
30	14	5322 360 10438	Valve Assembly	4	2	2	4	4	4	4	4	4	4		Y	
31	14	5322 535 10619	Hose Pillar CN-M5-PK-2	4	3	3	4	4	4	4	4	4	4		Y	
32	14	5322 526 10723	T-Hose Nipple M5	3	1	1	3	3	3	3	3	3	3		Y	
33	14	5322 502 14492	Screw, M2x4 Pan Head	8	4	4	8	8	8	8	8	8	8			
34	14	5322 526 10724	L-Nipple LCN-MK-PK-3	1	1	1	1	1	1	1	1	1	1		Y	
36	14	5322 466 12164	Guide Block	1	1	1	1	1	1	1	1	1	1		Y	
37	14	5322 529 10426	Dowel, RND 3 x 14 hardened	1	1	1	1	1	1	1	1	1	1			
38	14	5322 535 10621	Shaft, Spring	1	1	1	1	1	1	1	1	1	1		Y	
39	14	4822 530 70124	Circlip BLK4	2	2	2	2	2	2	2	2	2	2			
40	14	5322 535 10622	Pneumatic Pen	1	1	1	1	1	1	1	1	1	1		Y	
41	14	5322 502 14455	Screw, M2.5 x 6	2	2	2	2	2	2	2	2	2	2			
42	14	5322 466 12165	Guide Block	1	1	1	1	1	1	1	1	1	1		Y	
43	14	5322 265 11552	Contact Block (no pins)	1	1	1	1	1	1	1	1	1	1		Y	
51	14	5322 526 10725	Nipple, Restriction 0.25	1			1	1	1	1	1	1	1		Y	
52	14	5322 535 93554	Pressure Piece	1	1	1	1	1	1	1	1	1	1			
53	14	5322 532 12171	O-Ring A4 5,3x10	1	1	1	1	1	1	1	1	1	1			
55	14	5322 360 10437	Cylinder, Pusher Lower Bulk Cassette	1	1	1	1	1	1	1	1	1	1		Y	

(For pneumatic parts and electrical cabling of base block assembly: Continue on next page)





(Base Block Assembly: Continued...)

Item No.	Part of. Item No.	Ordering Code	Description	/00	Qty/Mod: PA2648/..									PI	Serv. Instr.	Remarks
					/35	/45	/50	/60	/70	/80	/85	/90	/95			
27-7	14-27	5322 320 12489	Interface kit: Cable	1	1	1	1	1	1	1	1	1	1		Y	
44	14	5322 528 11308	T-Connector T-PK-2	1	1	1	2	1	2	1	1	2	2		Y	
45	14	5322 530 10517	Synthetic Hose PU2	0.5	0.5	0.5	0.9	0.5	0.9	0.5	0.5	0.9	0.9		Y	Cut to correct length !
46	14	5322 320 12621	Cable, CU X8 – Sensor Assembly	1	1	1	1	1	1	1	1	1	1		Y	
47	14	5322 320 12622	Cable, Power Assembly (Flat Cable)	1	1	1	1	1	1	1	1	1	1		Y	
48	14	5322 530 10518	Hose	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35		Y	Cut to correct length !
49	14	5322 256 10544	Tie Holder, Self Adhesive	1	1	1	1	1	1	1	1	1	1			
50	14	5322 323 10462	Wire Tie 2,2 x 80 mm	1	1	1	1	1	1	1	1	1	1			

**Intentionally left blank**

---

## CHAPTER 9 Drawings and Diagrams

### 9.1 Diagrams

#### 9.1.1 Electrical Block Diagram

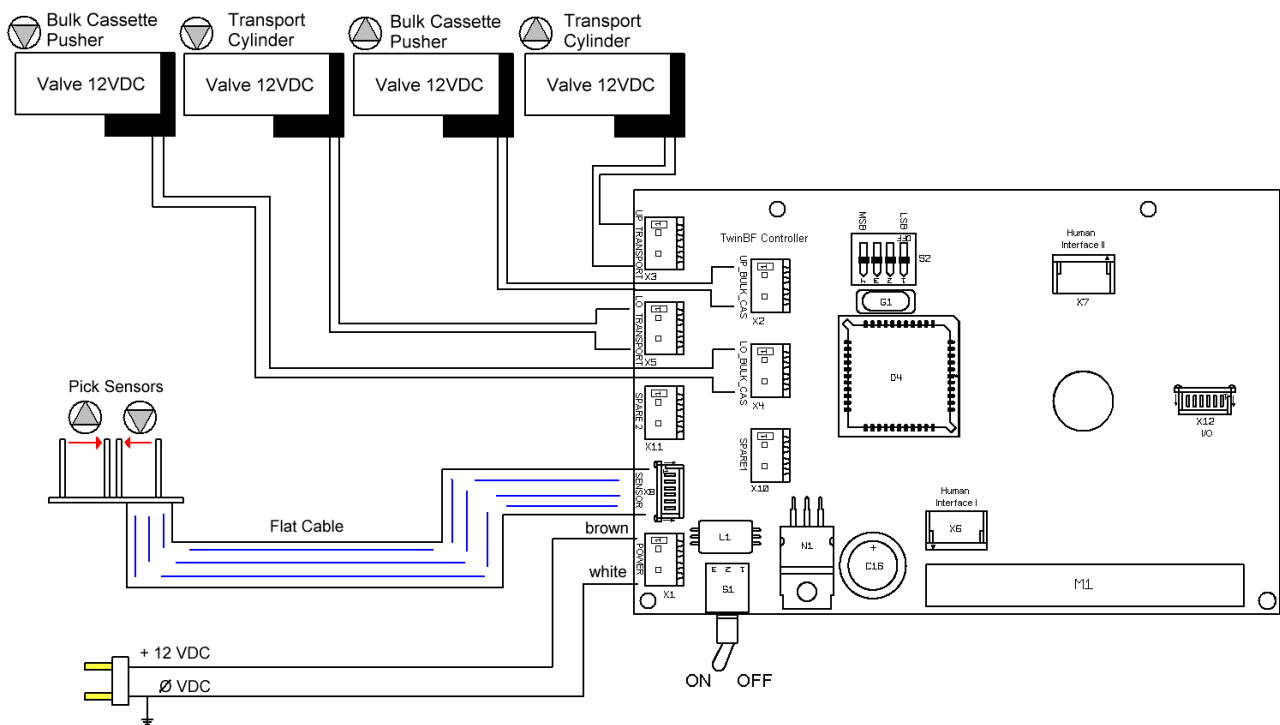


FIGURE 9.1.1

Electrical Block Diagram

### 9.1.2 Pneumatic Diagram

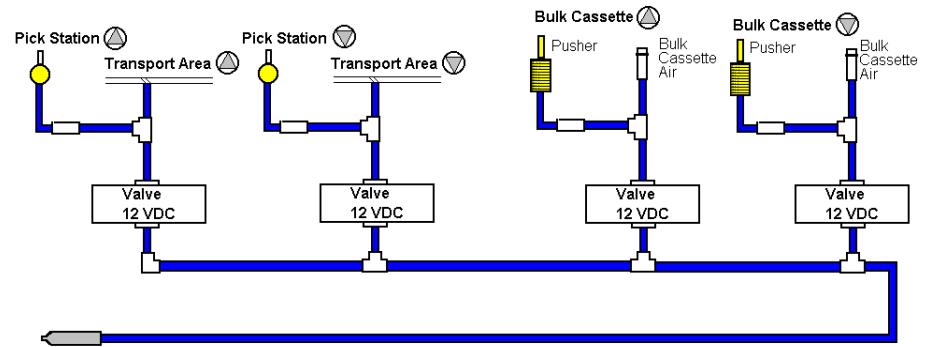


FIGURE 9.1.2

Pneumatic Block Diagram



# ***Assembleon***

LEADERS IN ELECTRONIC MANUFACTURING TECHNOLOGY

